DOCUMENT RESUME

ED 037 830	64	EA 002 859

AUTHOR	Carpenter, C. R.; Reilly, Susan Smith
TITLE	Quality Factors in Instructional Materials: Significant Statements by Authorities.
INSTITUTION	Pennsylvania State Univ., University Park. Dept. of Psychology.
SPONS AGENCY	Office of Education (DHEW), Washington, D.C. Bureau of Research.
BUREAU NO	BR-7-1142
PUB DATE	30 Aug 68
CONTRACT	OEC-1-7-071142-4372
NOTE	107p.
EDPS PRICE	EDRS Price MF-$0.50 HC-$5.45
DESCRIPTORS	Computer Assisted Instruction, Educational Quality, *Higher Education, *Instructional Materials, Instructional Media, Instructional Technology, *Instructional Television, Seminars, *Systems Approach, *Televised Instruction, Video Tape Recordings

ABSTRACT

Oral and written statements made by 52 college and university authorities in the field of instructional technology are reported. The statements were produced during a series of 12 seminars held between October 1967 and March 1968 at Indiana University, University of Notre Dame and Purdue University, University of Illinois, Pennsylvania State University (four seminars), National Association of Educational Broadcasting, Southern Regional Education Center and the University of Georgia, Florida Atlantic University, and Regional Education Laboratory of the Carolinas and Virginia. In addition, instructional media production facilities at the WGBH Educational Foundation in Boston and at the Education Development Center Film Studio in Newton, Massachusetts, are described. Major emphases of the seminars included the utilization of instructional television and the application of the systems approach to the achievement of educational objectives. (JK)

ED037830

BR 7-1142
PA-56

QUALITY FACTORS
IN
INSTRUCTIONAL MATERIALS:
SIGNIFICANT STATEMENTS
BY
AUTHORITIES

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U.S. Office of Education
Contract: OEC-1-7-071142-4372
Andrew Molnar, Project Coordinator

August 30, 1968

EA 002 859

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PREFACE

The principal assumption that was basic to the conduct of this Project on the conditions, requirements and variables affecting the quality of instructional materials with special reference to television systems (OEC-1-7-071142-4372) was that well informed, experienced and competent men can describe major and important factors and contingencies that relate to the quality of instructional materials. Quality was defined as the extent to which an instructional unit produces defined changes in the behavior and experiences of individual learners of target populations.

The conditions, arranged for about 100 experienced educators and media specialists, consisted of seminars of twelve persons or fewer intensively engaging in extended discussions on factors affecting the quality of instructional materials and media programs. Attempts were made to have a relaxed, noncompetitive and not hypercritical situation for the discussions as conditions for encouraging idea generation. Constructive and imaginative but realistically based thinking was generally encouraged and sometimes achieved.

The small seminar groups were introduced to the problems and purposes of the working sessions with the open and broad perspective that was represented by a chart entitled Sequential Operations of an Instructional System (see page 8). The settings for the discussions of the subject of quality factors were designed to be provocative of imaginative syncretic thinking. The complexity of the subject was suggested as well as the multi-dimensional and sequential character of the conditions and contingencies that affect complex human learning.

The intention of the Project staff was to have the information-yielding and judgmental seminars conducted on a general plane that would encompass most kinds of media, including printing, and all of the modes of the instructional communication process. Nevertheless, television often was the target model medium for the discussions. Emphasis was sustained, however, on the concept of multi-media combinations and the "systems approach" to strategies of instruction and learning.

The seminars were in session for from one-half day to two and one-half days. For those that lasted for one full day or more, the general discussions and intensive exploratory interaction led to a reasonable maturity of opinions and judgments of the majority of the selected participants.

Part of the definition of the task for each participant was that he should write or make orally a succinct statement describing one and not more than three of the most significant factors or conditions that, in his considered judgment, importantly affect the quality of instructional materials and the subsequent learning.

This report presents a selection of the significant statements that were made orally or in written form by fifty-two participant authorities of the twelve seminars, and statements by two persons who described the facilities and operations of a production center and production requirements for an educational broadcast station. Many of the significant statements were presented and recorded as the final part of the seminars. Unfortunately some of these were lost beyond recovery by equipment inadequacies and sound recording operational errors. The written statements have proved to be most carefully prepared and richest in idea content, and hence they are most valuable.

This report is the sixth of a series of reports that is being prepared for the U. S. Office of Education and specifically for the Commission on Instructional Technology.

The significant summary statements of this report are presented chronologically by seminars and alphabetically by authors. These orders of arrangement leave intact and in context each whole statement. Although edited, the statements nevertheless express directly and fully the concepts of the authority. Organizing the materials by subject categories would have seriously fragmented the statements. The coherence of the statements seems to increase the interest value of the report. The reiteration by different authors of some concepts, proposals and suggestions adds emphasis to particular recommendations. The urgent needs for training of new kinds of instructional media professionals, the requirements for instructional materials productions including new buildings and facilities and perhaps production centers, the needs for better financing and greatly improved utilization: these and other factors are described and repeatedly elaborated and emphasized.

Appreciation is expressed to all those who have engaged in the "IQ-TV" seminars, and it is hoped that the intense interactions on a subject of wide and great importance have had inherent rewards for those who participated.

C. R. Carpenter

Project Director
University Park,Pennsylvania
September 4, 1968

QUALITY FACTORS IN INSTRUCTIONAL MATERIALS
SIGNIFICANT STATEMENTS BY AUTHORITIES

Steering Committee for the Project

C. R. Carpenter, Research Professor, Psychology and Anthropology*
George A. Borden, Assistant Professor, Speech*
Samuel Dubin, Director, Planning Studies, Continuing Education*
Marlowe Froke, Director, Division of Broadcasting*
E. Arthur Hungerford, Associate Professor, Speech*
Donald Johnson, Associate Director, Division of Instructional Services*
Merrill E. Noble, Professor and Head, Psychology Department*
Stanley F. Paulson, Professor and Head, Speech Department*
Warren Seibert, Distinguished Visiting Professor, Educational Psychology*
Dennis Sherk, In-School Services Coordinator, Division of Broadcasting*
William Rabinowitz, Professor and Head, Educational Psychology Deparment*
Wendell I. Smith, Head, Psychology Department, Bucknell University

Staff Accreditation

Staff members who assisted with the preparation of this report were Lenley Lewis, Editor, and Trucilla Sabatino, Clerical Services.

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* Members of The Pennsylvania State University faculty.

COOPERATING INSTITUTIONS, DATES, AUTHORS OF SIGNIFICANT STATEMENTS, AND KEY TERMS

INDIANA UNIVERSITY - October 6 and 7, 1967

Malcolm Fleming, Associate Professor, Production Department, Audio-Visual Center, Indiana University
Key Terms: local and centralized costs; user alternatives

James Perry, Coordinator, Instructional Television, Indiana University
Key Terms: adequate financing, faculty involvement

Mendel Sherman, Assistant Director, Audio-Visual Center, Indiana University
Key Terms: identification of educational needs; awareness of media possibilities; adequate funding; qualified personnel; evaluation of instruction; in-service training

UNIVERSITY OF NOTRE DAME - PURDUE UNIVERSITY - October 25, 26 and 27, 1967

William Fuller, Professor, Mathematics and Dean, School of Science, Purdue University
Key Terms: faculty acceptance; Instructional Resources Center

William Hayt, Assistant to the Vice President of Academic Affairs for Television, Purdue University
Key Terms: faculty acceptance

Emil Hofman, Assistant Dean, College of Science, University of Notre Dame
Key Terms: science education and educational technology; facilities; national programs

James Massey, Acting Head, Electrical Engineering, University of Notre Dame
Key Terms: particular capabilities of television; faculty acceptance

Sheridan P. McCabe, Director, Counseling Center, University of Notre Dame
Key Terms: television as an extender of instruction; provisions for free time for personal interaction

UNIVERSITY OF NOTRE DAME - PURDUE UNIVERSITY (cont'd)

John W. Meaney, Assistant to the Vice President of Academic Affairs for Educational Media, University of Notre Dame
Key Terms: compatibility and translatability of media; media-rich environments; intra-university exchange

James Miles, Director, Television, Purdue University
Key Terms: systems approach to educational planning; state research and development centers

Warren Seibert, Head, Instructional Media Research Unit, Purdue University
Key Terms: teaching and evaluation procedures

UNIVERSITY OF ILLINOIS - November 2 and 3, 1967

Donald W. Paden, Professor of Economics, University of Illinois
Key Terms: personnel; financial resources; integrated facilities; teacher incentives to utilize media

PENNSYLVANIA STATE UNIVERSITY I - November 20, 1967

George A. Borden, Assistant Professor, Speech, The Pennsylvania State University
Key Terms: availability of information; content dynamics

PENNSYLVANIA STATE UNIVERSITY II - December 11, 1967

Norman E. Engle, Radio - Television Editor, Agricultural Communications, The Pennsylvania State University
Key Terms: acquisition of equipment; staff and talent

Marlowe Froke, Director, Division of Broadcasting, The Pennsylvania State University
Key Terms: involvement with existing structures; formation of a state department of communications; accessibility to materials; adequate funding; regional production center; storage libraries

L. P. Greenhill, Assistant Vice President for Resident Instruction, The Pennsylvania State University
Key Terms: research and development; empirical course development; adequate funding; acquisition of personnel; cooperation with industry

W. Carl Jackson, Director of Libraries, The Pennsylvania State University
Key Terms: adaptive change in administrations for communications

PENNSYLVANIA STATE UNIVERSITY II (Cont'd)

Dixon Johnson, Director, Public Information, The Pennsylvania State University
Key Terms: teacher training; interchangeability of equipment

Jacob J. Kaufman, Professor, Economics, and Director, Research on Human Resources, The Pennsylvania State University
Key Terms: technology and curriculum re-design; innovation through evaluation

Thurston M. Reeves, Head, Audio-Visual Services, The Pennsylvania State University
Key Terms: utilization of research findings; evaluation of effectiveness program

NATIONAL ASSOCIATION OF EDUCATIONAL BROADCASTERS - December 18 and 19, 1967

Joseph Kanner, Director, Armed Forces Training Films Production Unit
Key Terms: utilization of media; simplified T.V. production; researching objectives

PENNSYLVANIA STATE UNIVERSITY III - January 8, 1968

Robert Dudley, Assistant Director, Division of Broadcasting, The Pennsylvania State University
Key Terms: administrative desire for excellence; training of personnel; audience needs

Keith A. Hall, Assistant Professor, Educational Psychology, The Pennsylvania State University
Key Terms: research and development laboratories

Ralph T. Heimer, Associate Professor, Mathematics, The Pennsylvania State University
Key Terms: individualization of instruction; computer technology; multi-media systems; development of instructional theory

Donald W.Johnson, Associate Director, Instructional Services, The Pennsylvania State University
Key Terms: utilization of commercial broadcasting techniques; outstanding presenters; program evaluation

W. Lamar Kopp, Director, Language Laboratory, The Pennsylvania State University
Key Terms: availability and use of audiotapes; use of video tapes in simulated language situations

PENNSYLVANIA STATE UNIVERSITY III (Cont'd)

Wirth V. McCoy, Head, Art Department, The Pennsylvania State University
Key Terms: lack of aesthetic concern on the part of educators and producers; critical evaluation of programs; utilization of commercial broadcasting techniques

William Rabinowitz, Professor and Head, Educational Psychology, The Pennsylvania State University
Key Terms: program evaluation; application of learning theory; interest arousal and maintenance

Dennis Sherk, In-School Services Coordinator, The Pennsylvania State University
Key Terms: adequate funding; resource banks and laboratories

SOUTHERN REGIONAL EDUCATION BOARD - UNIVERSITY OF GEORGIA
February 8 and 9, 1968

William L. Bowden, Director, Department of Adult Education, University of Georgia
Key Terms: personnel; formulation of policy; utilization of new technology

Stephen Douglass, Training Assistant, Television Division, U.S. Army Southeastern Signal School
Key Terms: sequential learning; learning through direct participation

Lee Franks, Network Director, Georgia Educational Television
Key Terms: pre-production development; coordination of staff; evaluation of materials; facilities; program distribution; training of staff; evaluation of materials; facilities; program distribution; training of personnel; direction of teachers in use of media

Joseph T. Jordan, Jr., Assistant Chief, Television Division, U.S. Army Southeastern Signal School
Key Terms: learner-oriented instruction; qualification of teachers; systems approach to learning media; educational cooperation with outside concerns; learning through participation; adequate funding

Joseph Mingioli, Director of Television, National Medical Audio-Visual Center
Key Terms: central source for materials; storage and distribution of materials; specialization of personnel; coordination of efforts

PENNSYLVANIA STATE UNIVERSITY IV - February 12, 1968

Kenneth R. Beittel, Professor, Art Education, The Pennsylvania State University
Key Terms: systems approach to education media

Delmer P. Duvall, Supervisor, Motion Picture Instructional Services, The Pennsylvania State University
Key Terms: motion picture "target films"; regional production centers; teacher training

E. A. Hungerford, Jr., Associate Professor, Speech, The Pennsylvania State University
Key Terms: catalogue system for film; single concept films; film used in conjunction with videotape; revised distribution systems; evaluation of videotapes; television in dormitories; dial access audiotapes

Edward Leos, Supervisor, Still Photography, Instructional Services, The Pennsylvania State University
Key Terms: standardized layout for slides; training teachers in the use of slides; provision for innovation in the development of instructional media

Edward Mattil, Professor and Head, Art Education, The Pennsylvania State University
Key Terms: importance of evaluation; regional development centers; easy access to materials; adapting techniques of commercial broadcasting; storage systems; teacher and viewer training; development of models

FLORIDA ATLANTIC UNIVERSITY - February 22 and 23, 1968

Franklin G. Bouwsma, Director, Office of Instructional Resources, Miami-Dade Junior College
Key Terms: learning resource centers; faculty involvement; curriculum redesign

Kenneth A. Christiansen, Director, Radio and Television, University of Florida
Key Terms: extensions of instruction; understanding objectives; faculty involvement

Robert Gaither, Director, GENESYS Project, University of Florida
Key Terms: faculty involvement; understanding objectives

Harvey K. Meyer, Associate Dean, Academic Affairs, Florida Atlantic University
Key Terms: fulfillment of objectives; program evaluation; use of diverse media

FLORIDA ATLANTIC UNIVERSITY (Cont'd)

S. E. Wimberley, Vice President, Academic Affairs, Florida Atlantic University
Key Terms: faculty involvement; extensions of instruction; faculty advantages in use of media; increased financial support

Robert Wood, Television Coordinator, Florida Board of Regents
Key Terms: training personnel; adequate funding; centralized production; clearinghouse for media; implications of EVR and BEVR for future development

REGIONAL EDUCATION LABORATORY - CAROLINAS AND VIRGINIA

March 21 and 22, 1968

Samuel A. Agnello, Director, Audio-Visual Education, Duke Medical Center
Key Terms: instructional media in medical education; program evaluation

Cora Paul Bomar, Director, Library Services, North Carolina Department of Public Instruction
Key Terms: unique contributions of each individual medium; instructional models; design of equipment

Henry Cooke, Professor and Television Instructor, North Carolina State University
Key Terms: in-service teacher training; centralization of production and distribution

Robert J. Gwyn, Assistant Director, Department of Radio, Television, and Motion Pictures, University of North Carolina
Key Terms: culture of poverty; adequate funding; adoption of commercial broadcasting techniques; regional production center

John Harold, Consultant, Regional Educational Laboratory of the Carolinas and Virginia
Key Terms: elimination of unfavorable educational practices; stimulation and response teaching; acceptance of media

Everett Hopkins, Director, Regional Educational Laboratory of the Carolinas and Virginia
Key Terms: regional or state production centers

Edward K. Kraybill, Associate Dean, College of Engineering, Duke University
Key Terms: acceptance of media; in-service media workshops

REGIONAL EDUCATION LABORATORY - CAROLINAS AND VIRGINIA (Cont'd)

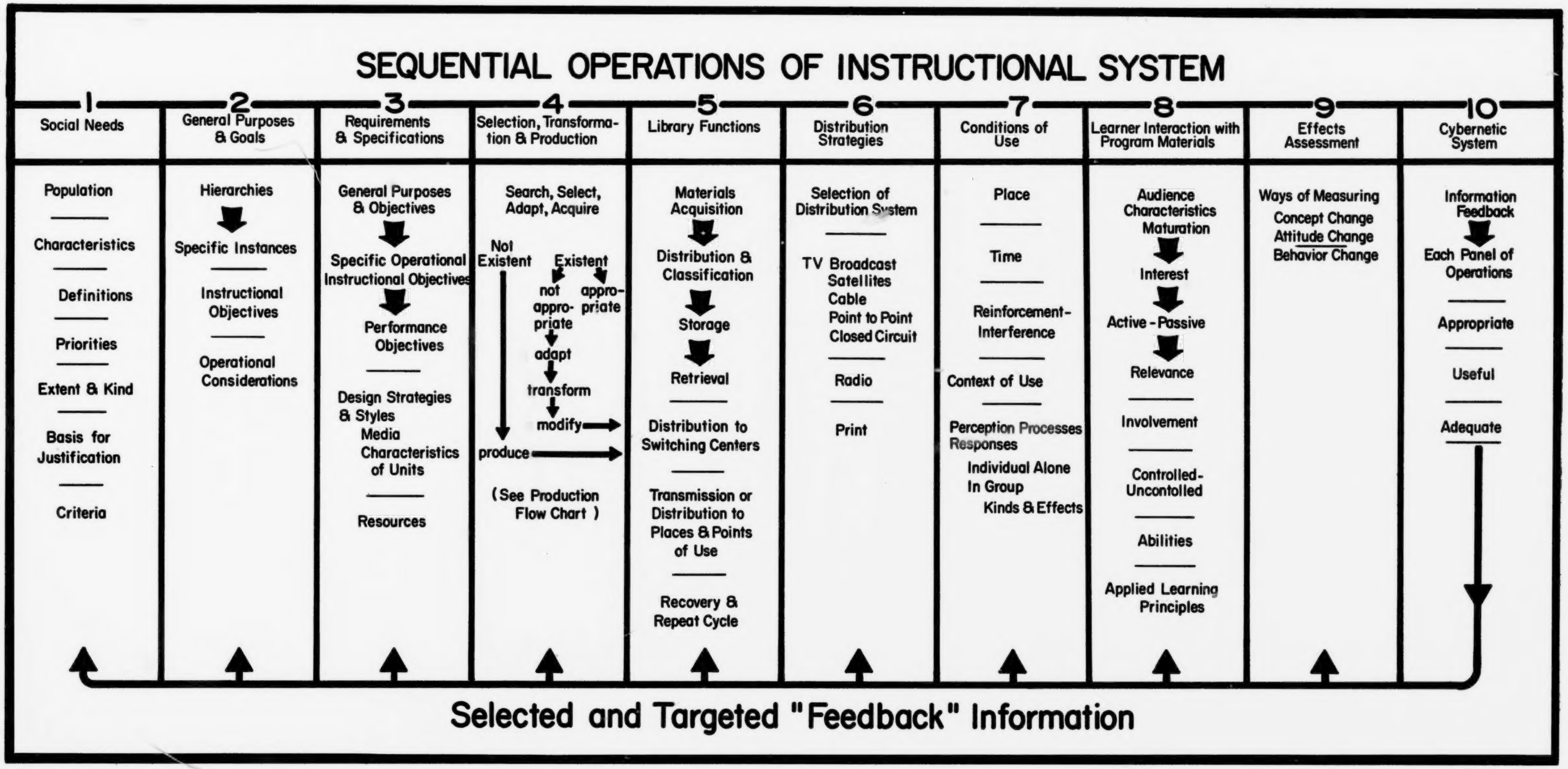
Ralph McCallister, Associate Director, Regional Education Laboratory of the Carolinas and Virginia
Key Terms: regional production centers; importance of administrative and faculty attitudes

Laurence Parkus, Manager, Instructional Television Development Radio Corporation of America
Key Terms: regional production centers

DESCRIPTIONS OF FACILITIES

Robert L. Larsen, Director, Education Division, The WGBH Educational Foundation
Key Terms: commitment; service demands; creative staff; differential rewards; innovation; new professional funds needed; instructional materials production centers

Kevin H. Smith, Vice President, Education Development Center Film Studio
Key Terms: educational materials production center; studios; shops; classroom; editing rooms; screening rooms; microcinematographic facility; graphic arts and animation; offices; photographic equipment; television equipment; personnel; productions



SEQUENTIAL OPERATIONS OF INSTRUCTIONAL SYSTEM

1 Social Needs
Population
Characteristics
Definitions
Priorities
Extent & Kind
Basis for Justification
Criteria

2 General Purposes & Goals
Hierarchies
Specific Instances
Instructional Objectives
Operational Considerations

3 Requirements & Specifications
General Purposes & Objectives
Specific Operational Instructional Objectives
Performance Objectives
Design Strategies & Styles
Media
Characteristics of Units
Resources

4 Selection, Transformation & Production
Search, Select, Adapt, Acquire
Not Existent
Existent
not appropriate
appropriate
adapt
transform
modify
produce
(See Production Flow Chart)

5 Library Functions
Materials Acquisition
Distribution & Classification
Storage
Retrieval
Distribution to Switching Centers
Transmission or Distribution to Places & Points of Use
Recovery & Repeat Cycle

6 Distribution Strategies
Selection of Distribution System
TV Broadcast
Satellites
Cable
Point to Point
Closed Circuit
Radio
Print

7 Conditions of Use
Place
Time
Reinforcement-Interference
Context of Use
Perception Processes
Responses
Individual Alone
In Group
Kinds & Effects

8 Learner Interaction with Program Materials
Audience Characteristics
Maturation
Interest
Active-Passive
Relevance
Involvement
Controlled-Uncontolled
Abilities
Applied Learning Principles

9 Effects Assessment
Ways of Measuring
Concept Change
Attitude Change
Behavior Change

10 Cybernetic System
Information Feedback
Each Panel of Operations
Appropriate
Useful
Adequate

Selected and Targeted "Feedback" Information

QUALITY FACTORS IN INSTRUCTIONAL MATERIALS
SIGNIFICANT STATEMENTS BY AUTHORITIES

INDIANA UNIVERSITY - October 6-7, 1967

Mendel Sherman - It is assumed that the term "quality" is considered, and measured insofar as it is feasible, in terms of the effect of instructional program on the learners for whom the program was designed. If this is the case, then the first requirement for a quality program is an analysis of the characteristics of the intended learners including an identification of those educational needs which the TV program is designed to meet. Such an analysis would avoid the mistake of applying media-centered rather than learner-centered considerations.

A second requirement of a quality program is a clear statement of broad purposes as well as specific objectives. The latter should be stated in concise behavioral terms.

In planning quality TV programs a third requirement is that the producers must be cognizant of varied approaches to media possibilities which can be employed to meet the specified educational objectives. The instructional TV program often functions as one factor in a complex of other unique media which need to be integrated into the overall program. In addition, producers of quality programs must consider time and cost analyses as long as funds and available time are limited. Which media to use must be based upon-

1. Specific educational objectives.
2. Available media.
3. Characteristics and unique contributions of the media to the specific educational objectives.
4. Cost/benefit analysis.

Requirement four is that the referent, instead of its representative symbol, should be presented to the learner. Because of a lack of funds, or imagination, or sufficient familiarity with learner needs, the learner is too often confronted with the "talking face," or printed digitals rather than the referents for which the symbols stand.

The fifth requirement is that too often, the process of recall or recognition are the chief mental processes involved. Learners should be motivated to infer, interpret, and create, as well as to recall and recognize.

A sixth requirement of the quality program is that there must be a recognition of the varied learner activities needed to attain educational objectives. Not all educational objectives can be met by exposure to 20 minute periods of evanescent stimulus materials. Sometimes stimulus materials need to be repeated and rearranged by the individual learner. This necessitates many forms of media and provisions for varied lengths of presentation in accordance with learner objectives.

Requirement seven is that adequate funds must be available. Undoubtedly the emphasis upon the "talking face," (the digital rather than the iconic) is partly due to insufficient funds. Ordinarily smaller expenditures are needed to provide verbal or audio symbols which stand for the referents rather than to provide the referent or adequate iconic representations of it.

The eighth requirement is that the quality program must be related either to an existing instructional program or to one about to be adopted. If the instructional program is one which will lead to curriculum reform, then it must be an integral part of a plan that will put the curriculum reform into effect.

Requirement nine is that quality programs necessitate a planning and development team with competencies in the following:

Instruction - (individual as well as group)
Curriculum construction
Message design and knowledge of various media potentialities
Learning psychology
Measurement and evaluation
Selected subject matter areas

The tenth requirement is that television programs should be changed in accordance with evaluation of their effectiveness. At present very little of this is done, due primarily to -

1. Lack of planning for evaluation and measurement
2. Lack of "know-how" regarding evaluation and measurement
3. Lack of funds

Requirement eleven is that teachers who are to use the program must be involved in in-service training activities. Such in-service training must be conducted during in-school time on a continuous basis. Special courses away from the school are helpful, but insufficient.

Malcolm Fleming - Stated here are three interrelated propositions concerning the variables affecting instructional quality:

1. Unit cost of instructional materials varies directly with their relevance in the sense that: (a) local production costs are high but local needs are best met as locally perceived; (b) centralized costs are low but often somewhat irrelevant or incompatible at the local level.
2. For a centrally designed instructional system the narrower the range of component alternatives reserved for the user (principal, teacher, student) the fewer the users.
3. The larger the number of classrooms to be served by a system of instruction, the more provisions for alternatives must be built in, such as: (a) alternative components or elements; (b) alternative teacher roles; (c) alternative sequencing of elements; (d) alternative criteria for terminal behavior.

A quickly conjured and hence very provisional equation for "quality" follows:

$$Q^1 = \frac{(\text{Amount of learning})\ (\text{Relevance of learning to learner goals})}{\text{Costs to individual learner}} \times \frac{(\text{Number of learners})\ (\text{Relevance of learning to societal goals})}{\text{Costs to society}}$$

James D. Perry - In my judgment, it is the lack of adequate finance for instructional television facilities and associated "software" that is the number one deterrent to quality. The financial base for the American educational system simply does not contain adequate provision for experimentation and innovation. What dollars are available are consumed for the most part in maintaining the status quo of education.

I do not feel that a massive federal support program for instructional television (ITV) is the long-term solution for improving instructional quality. However, a short-term transfusion in the form of dollars earmarked for ITV and other media might have a powerful effect. In the long run, the financing of academic endeavors should come from the academic budgets of the utilizing institutions themselves.

Once institutional commitments of sufficient funds are forthcoming from the administrators, one can devote attention to the other resistances which must be overcome through repeated demonstration. Here I am referring to the reluctance of faculty members to use media for fear of displacement or concern over impersonalization of instruction. All of the propaganda one could muster in this respect probably would not be as useful in overcoming traditional biases toward innovation in education as a few close-to-home successful demonstrations.

If financial support either federal or from within the academic budgets should materialize, whatever endeavors are undertaken should not have to show a profit or savings in terms of dollars invested for quite a lengthy period of time. Much more important to the educational system than short-term profit or savings is long-range growth in the form of increased instructional effectiveness.

William R. Fuller - I know of no general tendency on the part of faculties of colleges and universities to accept television, or other audio-visual aids, for classroom use. Short of administrative fiat, there will probably be no such general development in the near future. To say this is not to say that there is no value in ITV (or A-V in general), nor that teachers are wrong in wanting to continue conventional classroom instruction.

The view does suggest that university administrators and faculty members interested in the exploitation of the new technologies should abandon attempts to win large-scale faculty participation and concentrate on securing faculty approval, and even participation in isolated instances, for the use of ITV as a supplement to, and occasionally as a replacement for, conventional undergraduate classroom instruction.

If ITV is to supplement classroom instruction, a first priority, in a local sense, is to provide ITV outlets, at least in dormitories, through closed-circuit arrangements. This would not only make it easy for the student to avail himself of instruction but also to increase the academic role of the dormitory. Even more desirably, ITV should be made available on a community-wide basis through broadcasts. The opportunities are great for continuing education.

Concurrently, some faculty cooperation must be enlisted to use these local outlets. How is this to be won? First, program items would be designed for proficiency development and would include televised "lecture experiments" as described by Professor Hofman, problem solving sessions, areas in which visual presentation is essential. The long-range development, collection and utilization of instructional materials calls for much more than an ITV facility. There is needed the creation of an expanded audio-visual operation, called in some institutions an "Instructional Resources Center." This collection agency would provide the materials for ITV dissemination. From the outset materials should be produced not for ITV alone but with a view toward multi-media use.

The personnel of this center would include many more types of individuals than the conventional audio-visual center. Most academic departments would make "joint appointments" with the center. This would enable the center to work in a tutorial sense with individual students. In this capacity students will sometimes spend considerable time with center personnel in a student-teacher relationship. Usually, however, the center personnel will refer the student to film loops, tapes, and slides concerned with his problem. At the same time center personnel will be accumulating evidence concerning the need for additional materials.

Through interaction with departmental colleagues, additional faculty participation and cooperation will be secured for further development of the center and its activities. One area of considerable promise is that of providing self-study capability, and credit by examination in specific local courses. Since available A-V center material will not always duplicate exactly current course content,the guidance of the subject matter personnel of the center will be essential. Hopefully, the reduction in class size due to self-study options will help meet the cost of the instructional materials center.

Concurrent with these local developments, ITV micro-wave links with neighboring institutions will provide occasional replacement of conventional instruction by making available to students at one institution a specialized course given at another. Purdue's current links with regional campuses provides a prototype for this operation.

W. H. Hayt, Jr. - The basic question to which answers will be proposed is, "How can the university professor, and primary and secondary teachers, be encouraged to use televised instruction?"

In considering the wide range of possible answers to this question, we must realize that one simple answer is, "Tell him to use it!" This can, of course, be done with varying degrees of insistence ranging from a casual suggestion to an outright ultimatum. Such a technique can be applied to a complete course or a small portion of it. Thus, an ultimatum to prepare a five or ten minute insert might easily have a better chance of favorable reception than a suggestion to televise an entire course.

Another effective method consists simply of announcing that funds and equipment are available to implement televised instruction. These funds might be made available on the basis of an informal request from a teaching professor.

A more indirect method involves making the new educational technology more attractive by changing the boundary conditions on a course, such as increasing the number of students, decreasing the number of qualified staff, changing the course objectives, or changing the manner in which the course is offered, or any combination of these conditions.

All of the above alternatives assume that the dean or departmental chairman has been convinced of the effectiveness or inevitability of televised instruction. A method which originates with the professor rather than with the administration is to persuade him of its benefits. This is basically a two-step process: first, make him aware of its availability and possibilities; and second, convince him of its effectiveness.

The initial introduction can come in several ways. He can be given a brochure to read or discard, a generally ineffective procedure. Perhaps slightly more effective is the technique of telling him about it orally. If, however, we believe that these new educational methods are truly effective, then they themselves should be used to persuade him. This could be done before a department, using closed-circuit television (CCTV), film strips or loops, and any other combination of techniques that will demonstrate the capabilities of the media. Such a presentation for faculty members might be developed cooperatively by several institutions. The system can also be used to sell itself by enabling selected staff members to visit departments at other institutions where successful use has been attained.

Finally, the initial awakening can also come from the creation of some center on a campus dedicated to these newer techniques, provided that the administration of the center is autonomous and not merely a division of the library's audio-visual aids department.

The second step in the persuasion process requires some proof of the effectiveness of television, and this poses the greatest difficulty. Most of us who use it are fairly certain that it is _as_ effective as more traditional instruction, but we do not really believe that it is more effective. Thus we are faced with the conclusion that we cannot prove that it is more effective in general, but only under certain restrictions of time or space.

On the side of the newer methods, however, we do have evidence that students do better when they know they are part of an experiment. This will help initially on any campus or in any department.

It might also be beneficial to find out whether or not the effort a student puts into a course is to some degree proportional to the effort that he believes the professor puts into that course. If the teacher has taken time to provide a programmed-text segment, television inserts, or a computer-assisted program, will the student respond more actively to that portion of the course or to the course in its entirety?

The conclusions to this series of questions and comments seems to be that the administration can increase the use of educational technology by several means, and that there are effective methods of making professors aware of the current availability of such media; but that there is no real proof of its effectiveness in a teaching situation.

Emil T. Hofman - Because of the science information explosion, because of the logistics involved in science courses, and because of the very nature of science, it is likely that science education will be more dependent upon education technology than will any other discipline within the education framework.

The broad objectives of education technology in science education are similar to those for education in general. These objectives might be summarized as follows:

1. to be able to expand the scope of conventional education in order to involve more people in more areas of science;
2. to be able to provide more effective, more efficient, and more economical instruction within the conventional framework of educational institutions.

To satisfy the first broad objective, programs of the following types might be undertaken:

1. Video-taping of courses formally presented to students officially registered for the courses, and then making these tapes available to all students at the institution and to the general public.
2. Preservation (via video-tape or film) of significant events.
3. Cooperative sharing of resources by institutions so that each might have available the very best within the combined resources of institutions without wasteful duplication.
4. Participation by universities and colleges in elementary and secondary education through the preparation and distribution of useful, high quality teaching aids to school systems.

There is great need and opportunity to provide more effective, more efficient, and more economical instruction in science education. The large-class lecture section properly supplemented by means for satisfying individual student needs and interests is a suitable form for teaching university beginning science courses. Further, the new teaching aids allow the professors of these courses to present, illustrate, and demonstrate to all of the students in the large-class lecture section material which previously would have been impossible to present at all, or which could not have been presented with such clarity even to students in small groups. Professors of science would hope to incorporate more and better live demonstrations into their lectures, but, in general, they look to other people to prepare the materials (films and tapes) necessary to do so. There is indeed a good market for such materials.

Traditionally, the means for satisfying the individual needs of students in a large-class lecture science course have included recitation periods, quiz sections, and student-aid workshops. It appears, however, that these means do not satisfy the needs, and certainly they are not efficient or economical. There are already indications that education technology can furnish better means. For example, audio-tapes are used by some professors to provide aid to those students who need drill experience in certain areas. One of the greatest aids to the students in university beginning science courses would be a system designed to enhance their individual study performance through devices geared to individual appeal and operation. An instruction and learning resource center would be able to house such a system, but probably more effective would be a system directed to student dormitory rooms. An ideal system of this sort would be one in which students would have available sets of materials including a television receiver, a film-loop projector, an audio-tape recorder, and access to a computer. It would then be possible for a student, in the privacy of his room, to listen to a replay of the lecture he attended in the morning, to have a summary-review of test material, to receive individual tutoring via audio-tape, and to ask questions of the computer.

Throughout the years in this country, university beginning science courses have included scheduled laboratory periods. These rarely achieve their stated objectives; further, the laboratories are very costly in space. Alternatives to the laboratory are becoming more and more attractive to people directly involved in science education and to administrators, and except in the case of the student who is majoring in the particular area and who must develop certain skills, objections to laboratory substitutes are not well grounded in evidence. By using laboratory alternatives for other students, it becomes possible to make better use of space, equipment, and staff time for majors in the area of science. Video-taped and filmed demonstrations of the experiments, audio-tutorial laboratories, simulated experiments and the like might very justifiably replace the conventional laboratory in the university beginning science course.

A possible answer to the problem of developing and encouraging the use of new materials would be national programs. Accordingly, indoctrination institutes might be established on a national basis (similar to National Science Foundation Teacher Training Institutes) as well as on a regional and campus basis. Also, grant programs administered by a national agency with the cooperation of professional societies could lead to the development and use of better quality instructional materials. In this connection, mention might be made of the Small Grants Program of the Division of Chemical Education of the American Chemical Society which is designed to encourage individual science professors to develop teaching aids and to do so with a minimum of administrative involvement and control.

In this short paper, it was impossible to do justice to the topic, but in conclusion, I should like to predict with every confidence that education technology will find its most fertile field in science education.

James Massey - Based on the many observations and opinions expressed during this brief seminar, several capabilities of TV as an instructional medium have come into sharp focus. These include-

1. Magnification - the ability of TV to enlarge events taking place in a small physical space in such a way as to become visually accessible to a large audience.
2. Multiplication - this refers to the ability of TV to make present in widely separated locations an activity that is being engaged in at one central location.
3. Replication - the capability derived from video-tape recording techniques to re-enact at later times some event which is originally performed elsewhere, or to provide immediate repetition.

One and two seem peculiar to TV as a medium where three is shared to some extent with film. However, replication via TV seems to differ from that via film, in that (a) the recording is generally less formally made, (b) the time scale is often much reduced, i.e. repeat performances may be made as soon as a few minutes after the original performance, and (c) the nature of the record is such that it is considered less permanent and more flexible, i.e. there is a greater willingness to change portions of the record or to replace it with a new performance when advisable. When, however, video tapes are used as a more permanent storage medium, it seems that their use is equivalent to film and we should not then distinguish between the two media.

Television presentations involve the observer much more fully than purely auditory presentations (and perhaps film as well), and convey an atmosphere of spontaneity that seems difficult to preserve in other media.

It appears to me that the "multiplication" capability of TV has already been recognized as important to educational institutions and is already being exploited, at least on a small scale. The programs at Purdue University and the University of Florida, School of Engineering, are forerunners of an inevitable growth in this area. Certain other uses of "multiplication" have yet to be utilized, such as the sharing by several universities of distinguished lecturers and the making available to other universities of highly specialized courses for which qualified specialists in the field might not otherwise be available.

The "magnification" capability appears to offer professors an opportunity to conduct demonstrations they consider desirable for their classes but would otherwise be technically unfeasible. Such uses are primarily confined to science and engineering.

The "replication" capability seems especially suited to providing programs of continuing education without serious drain on already overcommitted universities. One can envision industries "enrolling" in courses in science and engineering and knowledgeable personnel participating perhaps as group leaders and acting as "teaching assistants."

None of these functions of television will, however, come into widespread use until individual faculty members and administrators become convinced of the potential of TV or until the use of TV is made sufficiently convenient. We cannot expect an instructor to choose a demonstration suitable only for TV presentation, no matter how much he might value the demonstration, if the use of TV will require weeks of prior planning, administrative skill, and technical expertise in the medium.

Consequently, if the instructional opportunities afforded by TV are to be realized in practice, it would appear that a three-pronged assault on the academic community is required. In the first place, pilot projects and programs must be developed which will demonstrate the unique advantages afforded by TV. Secondly, a well-conceived propaganda campaign will be required to bring these achievements before the academic community so forcefully that they cannot be ignored. Finally, assuming that large segments of the community have had their interests in the opportunities of TV sufficiently aroused, it will still be necessary to bring TV within practical reach of the individual professor.

Sheridan P. McCabe - Essential to the functioning of a university is the creation of a learning environment. Learning involves the acquisition of knowledge, attitudes and skills. Thus an environment which facilitates learning will be oriented less to information transmittal than to behavior change. Information must be transmitted in such a fashion that it is accompanied by appropriate learning in the area of attitudes and skills which are modified for learning through personal interactions. Thus the opportunities provided for meaningful interaction of the students with the faculty and with fellow students is a factor of great importance in determining the quality of the university.

Instructional TV is a more efficient technique of transmitting certain information than lecturing or other interpersonal contact. Freed of the lecture responsibility, students and faculty can devote themselves to cooperatively engaging in creative and imaginative thinking without slavishly attempting to cover a certain predetermined content.

The second contribution that instructional TV can make is to assist in the mobilization of all university resources toward educational ends. There is a tendency to limit the educational program to the classroom, library, and laboratory. With TV and other media, the educational activities can be effectively carried into all facilities of the university including student centers and dormitories. A number of studies have shown that the interaction of the student with his peers has a greater and more lasting effect on his learning than interaction with the faculty, at least under the traditional educational programs. The implication of this, it seems to me, is that education would be much more effective if extended into student-oriented aspects of university life.

If we view our educational methodology in historical perspective, we find that many of our techniques are very ancient. The lecture method certainly antedates the book, and there is relatively little evidence to support the contention that it is superior to the book in effectiveness of information transmittal. We can no longer afford to remain uncritical of the effectiveness of the methods we choose. The lecture method is particularly inefficient. We cannot afford to reduce great minds and great personalities to mere purveyors of facts. Through TV they can do this efficiently, and devote the time freed to dialogue with students.

John W. Meaney - One of the basic criteria of a "good" medium should be its compatibility with other media and its easy translatability into them. Books that begin as videotaped speeches should also be put into computers, in many cases, so that the key-words-in-context will be automatically retrievable in future searches of the field literature. In many cases it should be economically feasible to retain the multimedia existences of total works in permanent, side-by-side storage. The professor who makes a book required reading for his class, and who also wants to show his students a five minute video excerpt of the author speaking, may choose a particular segment of the recording. Another professor might want a different segment. Either of these professors might have in his class such an audio-oriented student that retention of the material could be improved by thirty percent if the entire tape could be listened to rather than read in book form.

An individual student's cumulative, computerized record may be made available to the professor at the time of registration sometime in the future, or certainly it should be available whenever a lag in the student's progress indicates the need for more individual attention. The professor might arrange the learning profiles of his students into sub-sections, each with a different program of learning activity, each with varying emphasis on the differing instructional media. Only through a media-rich environment in which much overlap or redundancy between media is allowed to exist may this development be brought about.

The specific characteristics of media vary, of course, as fast as the technology develops. So it may not be possible to say anything today about the advantages of television vis-à-vis film that will also be true tomorrow. If we assume that one of television's advantages lies in the fact that it can be erased and re-recorded with great flexibility, film may appear in thermoplastic or other form and claim the same characteristic. Therefore, the most profitable thinking on the relative advantages of media might well concentrate on the extreme ends of the media spectrum where the differences are so great that they might be around long enough to make the analysis worthwhile.

Compare television and computer-assisted-instruction, for example. Television has the obvious capability of conveying massive quantities of information to a great many people simultaneously. But the most distinctive advantage of television may well be that the kind of information that it is capable of transmitting includes the human image. This means that it can convey not only physical facts but a sense of human personality as a model for student emulation and motivation.

The computer, on the other hand, reaches the individual student at the keyboard and gives him a self-regulated paced stimulus-response situation that provides a relatively painless drill and reinforcement of learning. The amount of information stored in the computer may be fully as massive as that available on television, but its presentation is in sequential bits requiring interruption for student response, and this limits drastically the amount of information which can be brought to bear in a given amount of time. Also, the kind of information display adaptable to computers is largely restricted to print or graphics.

Thus the characteristics of these two media suggest that they are basically complementary. What television most clearly needs -- response and reinforcement of learning in the individual student -- the computer can supply. And what the computer obviously lacks -- the warmth of human personality and more effective methods of presenting the visual world -- television can supply.

We should expect, then, a marriage of these two media. We will probably see carrels in which TV tapes are interrupted by computer sequences, computer programs interspersed with tape segments, or both media used in alternate total units.

What instructional television should be doing nationally is exploring, through grant programs, every possible combination of local media application. The process of evolving the highest quality recorded segments for more than local use can be brought about almost as a by-product if the communication potential of television is adequately utilized to distribute the field testing results and other pertinent information about the material available.

In the cycle of interrelated development which the media are now entering, each institution would do well to seek out its own special area of concentration. Certainly production will have no national value unless it is highly concentrated. Intra-university exchange will probably always be most acceptable when there is a maximum of involvement all along the developmental-production-utilization line. Perhaps electronic involvement using the telephone or television media themselves is the best way of effecting this; interspersing regular program transmissions with planning or utilization conferences.

Purdue and Notre Dame might well bring about such mutual involvement; each setting out to develop production in some area of primary institutional emphasis and competence as well as in some area of secondary emphasis. In the first case there should be a faculty member from the home campus serving as chairman, but he should be assisted closely by other faculty members from other campuses in the state. In the second case the cooperating institution should have the chairmanship, and the home campus should supply one or more faculty members of the academic committee.

James Miles - During this seminar, I have spent a great deal of time espousing the systems approach to educational planning. One of the publications of the International Institute for Educational Planning has the best definition of the systems approach as it applies to education that I have seen. It is as follows:

A "systems analysis" begins by defining as clearly and precisely as possible the objectives to be sought. It then proceeds to identify the various alternative ways by which these objectives might be attained, and to weigh the relative advantages and disadvantages of alternative approaches in order to select the most effective, feasible, and economical one. Having chosen what seems the best alternative, it proceeds to elaborate a plan of action, including a timetable, a definition of actions to be accomplished during each phase, the various resources that will be required along the way, the nature and timing of results anticipated, and practical means for regularly evaluating progress and for making necessary changes in the initial plan. Any such plan must be tested and retested for feasibility during the process of designing it, and it is likely to go through several revisions before it is ready to be put into action.

The hallmark of this approach is that it views any particular way of solving a problem, of pursuing an objective or of getting certain work done, as a coherent "system," in the same sense that an engineer uses the term. It perceives a system not as a static structure but as a dynamic, well-organized and integrated process, having four main features:

Objectives: Well-defined tasks to be accomplished
Inputs: Resources (manpower, materials, etc.) needed to accomplish the tasks
Process: The methods, technologies and organization which combine and actuate the inputs to produce desired results
Outputs: The results actually accomplished

Here in Indiana as in many other states, we have undoubtedly developed a technical system before the educational system was quite ready for us. However, it is readily apparent that until educators are faced with the reality of using some of the educational tools, they will think very little about those tools. The developers of the technical system should be the instigators of the development of an educational system. While it is true that they cannot develop the system, they nevertheless must provide the impetus for it. They also must be around to see that there is an integration of the two systems.

Based on this systems approach, it seems absolutely essential that each institution of higher learning develop activities that will serve the following functions:

1. An individual, committee or some formal structure should identify goals. Specific tasks leading to the accomplishment of the goals should be defined.
2. Special resources and facilities are needed to implement plans of action if goals are to reached. Here, competency is needed in new and old methods, in the various types of media and in the proper approaches to research and testing.

3. An organization is needed to produce the instructional materials. This organization must work closely with function number four (library) so that locally produced materials are done only when materials produced elsewhere are unavailable or unacceptable. Teachers need to have at their disposal such tools as still and motion picture photography, graphics, all of the audio-visual devices, radio/television, computers and computer programmings.
4. Most assuredly, a library is needed, but a library with a different or additional mission than the currently accepted one. The new library must be able not only to store and retrieve printed materials but also to store and retrieve computer materials, audio materials, television materials, film and photographic materials. It should also have distribution capability or the ability to make these materials available to any and all classrooms when they are needed. It follows that this distribution capability would include electronic distribution techniques in addition to the normal human or mechanical delivery systems.
5. An evaluation section is needed in order that operations may be monitored at all times to determine how well previously established goals are being met. The evaluation group would also provide input into the continuing function of item number one because the goals and objectives of the system must be continually revised and updated.

To implement the above approach, I would suggest the following activities: (These are recommended on the assumption that there are institutions of higher learning in a state, region, or section of a state that can work together.)

First, there must be an understanding of the systems approach by the decision makers. This, it would appear, could best be accomplished by bringing together the vice presidents for academic affairs of the cooperating institutions into an extensive and intensive seminar in which they discussed the systems approach and implications of modern technology for higher education today.

Second, following the vice presidential seminars, these vice presidents should be charged with the responsibility to develop study teams for each institution in order that the goals and objectives of that institution can be determined and clearly stated for instructional activities. It is conceivable that a group such as the North Central Association or other accrediting organizations could serve as the basis for carrying out this work and providing outside assistance to the local study team.

Third, once the goals have been delineated, state-wide centers for the study and development of educational innovation, development and technology should be established. At these centers creative work can be done by those individuals from each cooperating institution who have been charged with responsibility for the development of a plan of action at that institution. Knowledgeable people in the areas of methodology and technology should be available at the center.

Following these leads, it would appear that the functions mentioned above for each individual institution could be begun or strengthened.

Warren F. Seibert - What irrational creatures we educators often are! We are supposed to teach but we don't know much about learning. We respect truth while we guard our personal myths. Our students did not learn yesterday, so we repeat today the procedures which failed us then. We gauge student learning by asking friends if they like our books. We devoutly intend to give students an education, but have never quite discovered the differences between educated and uneducated students. The wonder is that we ever succeed.

Educators may become the last large group in society to cease blaming humans for being human. Physicians, engineers, and other professionals seem quite willing to take people as they are and to work with them, limitations included, to accomplish specified goals. When a previously promising antibiotic fails to effect a cure, something different is tried. When a man-machine interface requires more of an operator than he can consistently give, the interface is modified. But too often, when an "instructional experience" leaves students unchanged and incompetent, the students are suspected of sloth and perverseness.

I propose that we grow in the direction of rational educational decision making. This will involve some difficulty because it requires the closer examination of both our teaching and our evaluation procedures. Easy lecturing will not always serve our needs, and those friendly criteria which always tell us what we want to hear won't serve either. Instead, we need a set of procedures which include detailed goal specifications, gathering of resources, instructional trial and effects testing, evaluation of learning effects, and modification of the teaching where the evidence shows a need for it. It seems only fair that if we ask or require students to learn from us, we should be willing to learn from them, when they are in a position to teach us.

ITV also needs greater commitment to clear purposes and to evidence. Fortunately, such commitment makes the most sense for a medium like instructional television which may involve large numbers of students and which includes means for recording and repeating instruction. Alternatively, we could continue typically to jury-rig our ITV teaching; to hold sacred theories about how it influences people; and to conduct friendly, irrelevant evaluations of its effects. If we do, those involved in the decision will be less than professional and students will bear the brunt of the consequences.

UNIVERSITY OF ILLINOIS - November 3, 1967

Donald W. Paden - The greatest contribution which television can make to the learning processes is to insure that the instructor and his teaching are far better than the instruction in fact is or could possibly be under normal circumstances. The enthusiastic acceptance of instructional television by students and by outside institutions, to say nothing of the instructor producing the material, is dependent upon the excellence of what is delivered to the student. Content, color, sound, authenticity, reliability, and freedom from error are all critical and indispensable components of acceptable television. Just as the success of computer-based instruction must be proved through practical demonstration of its technical and educational excellence, so must this be done for television.

Listed below are a number of suggestions which might contribute to such excellence. As a practical matter, it seems doubtful whether at the present time many educational institutions could implement these requirements even for a single course. The suggestions, however, make apparent the reasons for which acceptable instructional television is such a rare phenomenon.

I. Staff requirements:

1. Superior teachers who are willing to make the adjustments that are required by television.
2. Administrators who are dedicated to minimizing these adjustments and to keeping the paraphernalia of television as much as possible in the background.
3. An experienced and involved technical staff, some of whom are willing to "take the course" they are preparing, and to work for extended periods of time behind the scenes maximizing the impact of the new educational technology while minimizing its intrusion in the instructional process.
4. Thoroughly researched instructional materials (scripts, outlines, examinations, etc.).

5. A back-up instructional staff using the materials on an experimental basis.
6. An engineering staff dedicated in innovation.

II. Financial resources to support the following:

1. The preparation of detailed instructional objectives and materials.
2. The construction and validation of tests.
3. The typing and duplication of materials.
4. The repeated preliminary recording on video-tape of instructions at various stages of completion.
5. Final recordings at the highest possible level of technical excellence.
6. Provision for the editing of videotape and/or film.
7. The preparation of appropriate live and animated film.
8. The imaginative use of music, scenery, movies, and graphics for reinforcing the instructional message.

III. Integrated facilities at the heart of the college campus or high school:

1. Offices for instructors and staff.
2. Auxiliary services (photography, drafting, motion pictures, art duplicating, test analysis, access to computer, etc.).
3. Modern television equipment (color, special effects, split screen, delayed replay, etc.).
4. Specially designed "classroom-studios" for the rehearsal of materials with the students taking the course for credit (concealed cameras, overhead camera for desk charts, built-in rear view screen, etc.).
5. Built-in electronic response stations for each student for answering objective questions (with instantaneous scoring reported to the instructor).
6. A conventional studio for special projects.
7. Conference rooms for the preliminary use of materials with small groups of students.

IV. Incentives. Ways must be found at the college level of making instructional television a prestigious and rewarding kind of work within research oriented institutions:

1. Centers for the advancement of teaching might be established at a number of schools throughout the country.
2. Appointments of outstanding teachers to such centers for periods of several years, preferably away from the teacher's home campus.
3. Substantial pay differentials and travel allowances.
4. A year's sabbatical with full pay at the conclusion of the tour of duty.
5. Other rewards (including shared publication rights).

Which of the above suggestions is most important is difficult to say. All are probably essential if really acceptable instructional television is to be developed. Experience has repeatedly demonstrated, however, that generous financial support alone is not enough.

THE PENNSYLVANIA STATE UNIVERSITY I - November 20, 1967

George A. Borden - The following are a few rough ideas I believe worthy of mention.

One of the basic assumptions of information theory is that information is transmitted only when there is change in the signal. Speech teachers have taught that to obtain and maintain attention there must be some variation in the signals emanating from the speaker. Therefore it would appear that a primary law for the production of any instructional material is that it must concern itself with adequate movement in both physical presentation and content dynamics.

With reference to the above and to the psychological theory of mental balance, it appears that the mind not only needs variety, but also novel or unexpected presentation and content. Therefore the production of instructional material must be creative and innovative.

The immediacy and availability of the information to both teacher and student is of primary importance. With modern technology it should be possible for an individual to learn at his own self-determined pace. This necessitates a very efficient storage, indexing, and retrieval system for this instructional material.

THE PENNSYLVANIA STATE UNIVERSITY II - December 11, 1967

Norman Engle - The three items I consider quite important to the achievement of quality materials are- equipment, staff, and talent.

First of all, equipment and its utilization are important in contributing to a quality product, and obtaining the equipment and materials that will produce a quality product should be made fairly easy. Either inferior or inadequate equipment inhibits good results as well as the efficiency of an operation.

The second item of importance is staff. Quite simply, enough money must be available to hire professionals who know what they want and how to go about achieving it. The staff members should have full knowledge of the research that has gone into proved techniques and should act as directors or coordinators of the programs.

Thirdly, the performers are of great importance. This is an area that has not been researched as much as it could be. Should the performer be a highly respected and well-known expert in a subject area who has little or no performing talent, or should he be a less well-known subordinate who has a command of the subject as well as some competence in performance; or should the job be given to a professional talent who is provided with all the material and then simply acts? Which one is the most effective in communicating the message? Someone who is competent and less well-known, whom people would tend not to associate with acting could perhaps be effective, but our primary interest must always lie in conveying the message.

Marlowe Froke - In discussing the question of quality, a distinction must first be made between public and instructional TV. The term instructional TV distinguishes it from public educational TV, and it is questionable that the two can be integrated. Probably the best approach is to define what is meant by both public and instructional TV and to allow them to proceed separately. One of the reasons that the term public television developed is that the Carnegie Commission Study was done in conjunction with major metropolitan educational TV stations which do not have strong organizational ties to any educational institution. The members of the Commission did not see a way to resolve the many problems of the educational technologist working with the educators.

The only way in which technology really can have an impact on education is for it to become an integral part of the educational institution. Along these same lines, there is certainly a tremendous number of frustrations involved in working with curriculum specialists or methodology people in a college of education. There are also frustrations to be found in working with individual school administrators and teachers out in the field. But once you do work with them all, and find ways in which they can work together, you stand a much better chance of success than if you went your own separate way to produce something.

Frances Andrews, the Head of the Music Department at Penn State, takes one of the programs in the series done by the music education department with her to conferences to show to teachers who are in the field. When she conducts classes, she takes one of the programs to show to her students. The Department of Public Instruction people who were involved in the construction of the series also take tapes with them to conferences. The school administrators and teachers from the Allegheny Educational Broadcast Council are now advocating its adoption as an instructional series. This particular case illustrates the potential rewards of involving technology in a direct way with existing institutional structure. Instructional television, however, made the mistake of forming a commission which was isolated from what was already being done by other concerns.

The second point that I would make is that when it comes to technology, there should be a separation of functions. In talking about programs or lessons that are produced, we often include the problems of distribution or utilization which are in another category. I would make three different distinctions: (1) the software, or the instructional material that is actually transmitted over the system; (2) the total system as it relates to the technical equipment; and (3) the use of the material once it has gotten to its particular location. I think one way that this problem might be resolved would be to establish a state department of communications which would deal specifically with the communications problem on a statewide basis, or even a department of communications on a national level as has been suggested by President Johnson's Task Force on Communications. Until the issue is elevated to this status, more problems and confusion will develop.

The third observation I would make is that the problem of instructional TV is not so severe as many people believe. Instructional TV has only existed for fifteen, or at the most, twenty years, which is not really a very long period of time. During this time some specific progress has been made. For example, speaking from the limited experience that we at The Pennsylvania State University have had with the Allegheny School Council, there has been no reduction in interest on their part during the past two and one-half to three years. We began with school administrators enrolling 35,000 pupils in the area, whose numbers then grew to 68,000 then to 130,000. This year we have contracts for 142,000 students. We anticipate that before the end of the school year we will have somewhere between 160,000 and 170,000. This indicates that the school administrators and teachers are thinking about ITV's potential. The parochial schools are also beginning to take an interest.

Finding ways to develop enough financial support for the system are gradually being taken care of at the state level, and not only at the lower level of the Bureau of Instructional Materials, but with the Commissioner of Basic Education as well. Progress is being made, and the problems are not quite as severe as the Carnegie Commission and other reports have indicated.

In order of priority, these are the steps I would take if given the funds to dramatically improve the quality of instructional television:

1. Equip every classroom in the country with a television receiver. A rapid solution to the accessibility problem would do more than anything to improve quality. In equipping every classroom, I would require that the schools work through their educational television station, or colleges and universities that are in a position to give sound technical advice on system design.

2. Give each educational television station in the country about $15,000 to $20,000 for the hiring of one or two people who would work only with teachers in the field on how to use television and film effectively. They would be on the road with workshops on general, series, and indiviual program utilization.
3. Give major grants to colleges and universities to establish and develop strong communications programs in their colleges of education. Training programs for teachers, administrators, and just about everyone on what the communications revolution is all about are imperative. Help from industries such as AT&T, RCA, and IBM is needed in development of the programs because most of what is being taught in the media courses is either irrelevant or hopelessly out of date.
4. Establish in each state or region a major production center for instructional material programs. The individual centers might be specialized in elementary, intermediate, junior and senior high, or adult education.
5. Strengthen the libraries which have developed such as Great Plains and Eastern Educational Network, The National Center for School and College Television, and add one or two more.
6. Explore film libraries which presently exist as distribution devices for video-tape materials.

Another reason research is ignored may be the tendency to try every device at once; sound, color, elaborate titles, in the hope that they just might happen to teach better. These things and others are all operating against quality. One answer to the problem might be to get the results of research to the consumer who requests the film originally, and inform him by sending films which incorporate testing devices. This might demonstrate to the people who use the films that the film makers are not adequately filling their requests. This might also bring about an eventual reduction in production cost, and a much more widespread use of films.

The evaluation of educational films' effectiveness has for the most part confined itself to easily measurable variables. Perhaps the remedy to this would be to encourage independent research and production. The video tape recorder and the eight mm. film make this feasible, and such independent activity could lead to increased production of films as well as more productive experimentation and utilization than a gib-business approach can provide. The results of all this could be extremely fortunate not only within this country but might possibly result in a major export industry of teaching materials and know-how in the use of the media.

L. P. Greenhill - In thinking about the three or four most important factors or conditions which have high probability of contributing significantly to an improvement in the quality of instructional materials, I approached this question from the point of view of a person whose interests and background have been in research and in producing and testing instructional materials. One of the first and most important steps is to conduct rather careful research and then apply the results of this research in production. The application of already known research results would make the greatest single contribution to improving the quality of materials in terms of effects on learning.

In the past twenty years there has been a considerable volume of research on instructional films, on instructional television, programmed instruction, and various combinations of these. There is information available about the effects of certain techniques and production variables such as the use of repetition, built-in requirements for audience response and provision of knowledge of results, the use of subjective camera angle and so forth. One rarely finds these results applied in the design and production of instructional programs. One of the big barriers to the utilization of this knowledge is that the information isn't available to the people who need it, and it is not in a form that can be used. While it might be helpful for studies such as the one being conducted by Wilbur Schramm at the ERIC Center for Media to collect the research, and perhaps to put it in a computer or in some other way collate it, the fact is that it is not in a form that can be understood and used either by the teachers who prepare and present instruction, or by producers who work with teachers in preparing it.

A second large and important factor is the concept of empirically validated instruction, or what is sometimes called empirical course development. This is the concept that research and development begins by stating objectives, both in general and specific terms. Not only should we state them in those terms, but we must also ask "why" for each item. This is one of the ways of eliminating material that is becoming out-of-date, then developing programs, and program in a broad sense can mean any kind of instructional material, and testing them in terms of the stated objectives. Having tested them, changes or improvements can be made based on how people perform. Sometimes this much is done, but I think it has to be carried one step further; one has to compare the new version with the original version and draw up conditions to see whether or not an improvement has been made. All too often we assume that if something is done a second time, it is done better, but it may not be. Several successive revisions may be needed before the objectives are achieved.

Such a rigorous program practically precludes failure if carried through to completion. On the other hand, it is not a simple job. First of all, it is incredibly difficult to state objectives, both in general and in specific terms. It is often very difficult to build good performance tests, especially in some areas that lend themselves easily to the kinds of testing that we have become accustomed to. Sometimes having several different audiences which are not necessarily compatible in their requirements presents a difficulty. For example, one such program, which looks fairly good and hasn't acutally been tested yet, has been rejected by the sponsor because he didn't like the particular approach that was expected. The Office of Education is reluctant to give money unless programs are constructed to suit them, i.e. to comply with supervisors expectations.

Another probler in connection with applying the method of empirically validated instruction is that it is very expensive. It costs money to make a program over, it costs money to develop tests, and it takes time to test these programs in the field. This is one area in which the Federal government could be very helpful. At the college level, for example, a professor may work on developing a course with either no release time or maybe one-fourth or one-half release time. It takes a great deal more time than that, and as a minimum for just one course consisting of thirty lessons, probably the cost would be between $50,000 and $100,000. Most institutions don't have enough money to develop course materials.

Some people suggest that money be put in to develop lessons or courses which will be used nationally. This is the kind of solution that the Ford Foundation, working with the National Broadcasting Company and Continental Classroom, proposed. The fact is that everybody doesn't use it, and it's not likely that they will. This is one of the problems with the National Science Foundation undergraduate curriculum improvement program. They're investing a lot of money in the hope that everybody will use their curriculum. Undoubtedly, a large number of people will, but it's not going to be used by everyone. We need support for a few large projects but a great many intermediate levels and smaller projects which will have regional or local impact are needed. If they are good, they'll get national distribution, but this should not be made a necessary condition.

Another area which can make a very significant contribution is the training of staff and teachers. In the field of instructional film and instructional television production, and also perhaps the field of programmed instruction, there are very few people who really know anything about teaching and learning. Most producers, for example, have emerged from a theatrical or some other kind of background. Such personnel are not being trained, and no existing program is designed to train them.

Last year and the year before, the interdepartmental committee on broadcasting at this university tried to develop an option in the broadcast major for instructional television, involving a basis in liberal education, a certain number of technical courses that relate to production, and several courses in the areas of measurement and learning principle. It didn't go through, and as a consequence of this and other such failures, too much emphasis is put on the "frame for the picture" by producers and not on the picture. They make a beautiful frame, with all sorts of special effects, but the needed instructional communication isn't there.

The same exists with respect to teachers, but perhaps the faculty development program that the Office of Education is launching will in time begin to train people and give them the necessary background to utilize these materials. The fact is that one of the biggest impediments to progress in this area is a lack of trained people in terms of the teachers, the users, and the producers.

Most of the other factors have been discussed by other participants, such as the need for cheaper materials for storage and distribution. We also need a better system for rewarding and not punishing innovators, expecially teachers who are willing to try something different. We need to develop integrated systems of instructional materials in which we tie together program materials, television, etc., each of which has to do a different kind of job. Perhaps one of the biggest areas that we need to be concerned about is how to develop the proper relationships with industry, as Ray Carpenter has suggested numerous times. Industry has funds and resources with which they are attempting to win support from institutions of higher education, looking for ideas and people, but there is a great difficulty in communicating. The scientist is interested in seeing that instructional materials are not misused, and he has and should have some control over their use. Nobody knows quite what incentives a scientist needs or what sort of remuneration he should be given in order to work with industry. In many cases, commercial producers have found that educators are sometimes willing to give information and materials at no cost at all. Educators, too, want materials for non-profit use and try to get them without royalty, but there is a big problem area here that needs to be explored and solutions found.

W. Carl Jackson - I share Dixon Johnson's concern about the quality of textbooks that are available. This parallels the quality of some programs I've seen of ETV across the country. They're all of a kind, and there is a certain stamp about them that has to be changed. As to the method of achieving this, it is difficult to make suggestions. In education per se, education is a business. It is the property of educators whether they happen to be professors at a university or teachers in a grade school, and this has to change. There is no guarantee, of course, that a different administrative structure guarantees a different mentality or a different approach. Setting up another bureau or new agency may just extend the same objectionable restraining pattern of administration.

We should provide for all kinds of channels that would permit communication of many kinds of content. These two changes, administrative and communicative, must go hand in hand, and ultimately, they might lead to a situation in which people will have access to what they need to learn, whether it's in a film, a programmed course or a book. When and if we ever achieve the kind of accessibility to information for learning that could be possible, a change in our whole educational pattern will become a reality. This would be a true revolution.

Dixon Johnson - The scope of the operational change we need to make in the interests of high instructional quality is very large. I am speaking not only of instructional television, but computer assisted instruction and other media as well. It is very hard to adapt to a new system, and we have to eliminate psychological barriers before this system is developed the way it should be. We should begin by trying to train a different kind of teacher who can adapt himself to many different situations.

Another important deterrent is the total lack of integration of equipment and the lack of interchangeability of equipment between the various manufacturers. If nothing is interchangeable, the cost of altering a program becomes phenomenal and the program becomes very inflexible.

The quality of educational materials, too, often leaves a great deal to be desired. People with imagination and humor are apparently not involved in the production of these materials, which is unfortunate.

The capabilities of new educational technology are enormous, but we are going to have to expect rather slow, stage by stage progress for some time to come.

Jacob Kaufman - This is a very brief summation of one particular point. There is a substantial body of knowledge coming out of the social sciences which is in general agreement about the direction that education ought to be taking. This direction is not being followed by our existing educational institutions. My concern is that the application of educational technology will reinforce the existing structure and make it even more difficult to change the educational process. Therefore, the problem should not be approached in terms of how educational technology can be applied to education, but in terms of how the role of education should change, and how educational technology can assist in this change. My stress is on the issue of how educational technology can be used as a means for redirecting education.

The question of how to encourage innovation in the educational system is a very important one. Probably the best way to direct change is through evaluation. If an educational administrator or teacher asks himself what he is trying to achieve and how well he is succeeding, he will probably conclude that the educational process must change, because what education is presently engaged in is not achieving its objectives and meeting social needs.

A sociologist at Princeton made the point that educators should ask themselves, "What do you want your children to be?" You have to answer that kind of a question, and then adapt the educational system to accomplishing those objectives. Unfortunately, we have an educational system through which we force the youth, saying, "You adapt to this environment," instead of realizing that these youngsters have needs, aspirations, hopes, and interests which the institution should be adapted to. We should challenge youth to build a new and better environment.

The introduction of an innovation into a school system meets with irrelevant objections from all sides. The typical school superintendent or principal says, "We can't schedule it." The scheduling process dominates, and until the educational system stops worrying about scheduling, space etc., and concentrates on the truly relevant problem of developing people, we'll never see any real change.

Thurston Reeves - In relation to the question of factors related to the quality of instruction, it appears that film research has had little effect on production practices. There may be several reasons for this tendency to ignore the findings of research. One may be the American proclivity for the glamorous, and another is that the small independent film maker has been eliminated through both failure and success. The latter phenomenon is just beginning to occur - the successful small producer is being bought out by Columbia Broadcasting System and other large corporations. This certainly carries the hazard of losing the experimental aspect of film production.

NATIONAL ASSOCIATION OF EDUCATIONAL BROADCASTERS - December 18-19, 1967

Joseph Kanner - In 1965, Army audiovisual personnel did a rather extensive survey of the role of audiovisual media on Army training, something which had not been done in twenty years. We found that we spend six million dollars a year on training films and twice that amount on educational TV. This year we spent close to fifteen million on hardware alone. Among the things we did during the survey was to visit five major installations having populations of fifteen or twenty thousand each, offering thirty or thirty-five thousand hours of instruction over the year. On a sampling basis at each of these places we visited 250 classrooms, eliminating classrooms where the students actually touched the equipment and put into practice what they had been taught. We visited mainly lectures and demonstrations in order to see what audiovisual aids, if any, they were using. Out of the 250, 125 classrooms used none. In the others, the most frequently used audiovisual aid was the overhead transparency. This is very simple and easy to use. Just thirteen classes of the 250 used motion pictures, with 800 new reels produced by the Army every year and a huge depository of films available. Aside from the reasons for this lack of utilization, on a sheer descriptive basis, this is very sobering in terms of total impact. If this sample is representative of all Army training, and it probably is, then we are really having a very small impact on the Army's training program.

In the area of television and motion pictures, the Armed Forces harbors two distinct camps, one a majority and one a minority. The majority uses motion picture-TV approach, for which cliches were set down in 1942 when Hollywood invaded the Army pictorial center and laid down the format for training films which they have followed to this day. The cliches were established for scripting and a long drawn out shooting process, and it takes about two years to make a training film. When television first appeared, people said, "Why TV when we have motion pictures?" Television's advantage is speed; a finished program can be produced in a week if necessary. As TV grew, however, it began to imitate more and more the habits of the motion picture people. Script writers and electronic editors were added to TV facilities personnel. All this illustrates a dominant philosophy in the Army.

The other approach utilizes a head man with a crew and a mobile TV unit. As soon as the type and length of program for a particular curriculum are identified, they get the instructor and put him in front of the camera and rehearse him just once, then shoot for thirty minutes with no editing. This product interspersed with the other one exhibits very little difference. In terms of effectiveness one isn't any better than the other, because the Army does not test individual hours of instruction except under special conditions. Until someone demonstrates to us that the more elaborate approach is more effective, we should adopt the quicker and simpler of the two.

Studies are now being done to determine which techniques are most effective, but if you give these various findings to television and motion picture producers, they will experience difficulty in applying the techniques to their particular film or TV productions. These things must be tried on a rule of thumb basis, then done over again on the basis of student learning, in order to pinpoint the exact place where these various production techniques can be used. In military training or non-military training, however, the opportunity to do things twice is rarely present, so that research results and skill in production becomes essential.

THE PENNSYLVANIA STATE UNIVERSITY III - January 8, 1968

Robert Dudley - I would like to discuss two items which are keys to improving the quality of instructional television. The patterns of development of instructional materials for television will probably evolve based on the patterns we have already established. They should therefore acquire those additional elements that will work to make them dynamic television. Wirth McCoy spelled out a few of these elements, and I would like to add that dynamic television can be achieved by (1) a sincere desire for excellence on the part of the administrators having responsibility for the creation of a collection of instructional materials for quality programs, and (2) an understanding on the part of production personnel of the necessary requirements for achieving quality in the radio and television media. We need to recruit talented individuals throughout the country who know the potentials, the capabilities, and the limitations of their medium and have an appreciation for the vitality and validity of the multi-media approach in packaging, and those who will create the materials should have an understanding of the needs of the audience. Such an organization would have projects with adequate staff, realistic financing, and specialists in media and education functioning throughout the development, production, and evaluation phases of the project. The possibilities of pre-broadcast failure would be assumed to be a part of the price of success.

Keith A. Hall - One of the real problems in the production of instructional media has been the administrative structure for such production. To really improve the quality of instructional media we need something like a research and development laboratory. Only in a laboratory of the kind that I visualize can researchers and developers test reasonable alternatives. This is one way of improving the end product. An instructional materials laboratory should base its production on a test, revision, and retest cycle, so that when a product is exposed to students, and has been revised on the basis of the reaction of those students it will produce the intended learning.

Ralph J. Heimer - I have listed four conditions which have a high probability of contributing significantly to the quality of instructional materials, and I am interpreting broadly the definition of instructional materials to include printed materials as well as audio and video recordings.

First, I think that a dedication to the individualization of instruction in the development of instructional materials and procedures has considerable merit and could lead to multi-media instructional packages that are very different from usual packages.

Second, a dedication to the development of sophisticated multi-media instructional systems which are under computer control would be another good approach.

Third, a dedication to the development of real instructional theory is necessary. I regard instructional theory differently from learning theory.

Fourth, value theory and instructional theory should be subject to the possibility of empirical validation. Theory should be so developed that one may acquire either support for it, or evidence that it should be rejected. Materials development and theory development should go hand in hand. The most powerful tool we have at our disposal for integrating them is the general purpose computer. It seems impossible to cope with the management and decision-making problems of a system of instruction that is truly individualized without the aid of a computer. The same is true for sophisticated multi-media packages.

In conclusion, I shall quote Ralph Girard, who is dean of the graduate division at the University of California at Irvine. "The most important impact on education by computer technology, and I use this in its broadest sense, will probably be to supply a tool for finding out what we are doing. For turning anecdotal, impressionistic answers into scientifically testable ones. And so turning what has been almost purely an art into a respectable science. And without eliminating the artistic aspects either. Research and education, advances in educational understanding, and education as a behavioral science will be, I think, the most important outcomes."

Donald W. Johnson - I have three brief statements to make: First, I think we should adopt or borrow whatever we must from other areas in order to deal better with our problems. People in business and other parts of our society have developed effective methods of dealing with similar problems. We should try their solutions on our problems. Whatever model we develop, however, adequate feedback and good communication must be incorporated among all of the people working in various areas of the same program.

Somehow we have to identify and use outstanding presenters. Many people are much better qualified to perform certain functions than others, and if we are concerned about quality, these people should be sought out.

I would also like to make a point about evaluation. The concept of evaluation needs to be expanded and used in almost the same sense that the pilot of a plane uses his instruments to control the flight. The whole concept of evaluation needs to be expanded and worked out in a better way.

W. Lamar Kopp - I shall limit my comments to the question of audio-tapes and printed materials. If my suggestions seem somewhat pedestrian and limited, at least they involve the possibility of being immediately implemented.

A team approach should be undertaken by the instructional specialists in the languages in planning the comprehensive study of the availability and the systematic use of audio materials already produced. There is much material available, but it is not affecting language instruction as much as it should be. This team should develop new materials consisting possibly of short video units actively involving the learner; units that will simulate as much as possible the actual language situation. Since language is a skill that is learned in a specific context, it would seem that it should be possible to develop certain units that would involve the learner in such a simulated language situation. Today language laboratories exist only as a kind of one-way listen and one-way speak procedure. No one has, to my knowledge, tried to develop units that involve the learner in an actual live realistic and dyadic verbal interchange.

Along with this, I think we should develop coordinated short audio-tapes for systematic drill and for the expansion of material presented in video units. This has been tried on very limited scales, but never extensively. Most important, the materials developed by such a team could be made available for individualized study and self-instruction. That is, they should be available not only on a class basis, but on individual bases, and not only at given times, but at almost any time a student would care to use them.

These are some ideas that it would be possible to implement now or within a short period of time.

Wirth V. McCoy - My first experience with television filled me with a kind of awe; since then I've come to wonder why its enormous potential has been misused or remained undeveloped. Why hasn't it been put to better use in this country where tremendous population growth is outstripping production of teachers, courses, and universities? Obviously, there have been many good uses of this medium. But our presence in this seminar indicates dissatisfaction with and concern for the present level of attainment in ITV. It is my belief that generally, ITV is the best answer to the educational problems which will increasingly confront our growing population. For through it, teachers may meet students in vaster numbers than in any other way. Educational programs may be broadcast from centers to homes, dorms, or anywhere where reception stations are created for students. To answer the needs of education, however, programs of excellence must be created, and we must create quality vehicles.

I'm not convinced that technical inadequacy is the factor that defeats much of ITV today. I am convinced that a lack of esthetic concern, professional direction, and an exciting image is the greatest cause of all our failures. In order to create quality vehicles, it is necessary that there be cooperation and critical interchange between medium-oriented experts and knowledgeable, dynamic content people in the development of programs, courses, tapes, and films. They must be willing to edit, remake, and update material they have created. There must be critical evaluation and selective judgment in the acceptance or rejection of the finished product based upon successful application to the purpose to be served; high quality from the standpoint of overall excellence, open-endedness that will allow room for addition, change, and relationship to the current and altering spirit of the times.

Also, we must utilize the highly developed expertise of commercial television people to assist in the development of educational programs, selecting only the best, and avoiding trite aspects of the present commercial medium. We must subject students to techniques and ideas through instructional materials, thus prepared, and support these ideas with creative stimulation in the nature of confrontation by great teachers.

William Rabinowitz - I would like to make three points: The first point concerns evaluation, with reference to the evaluation of the outcomes of instruction. Materials should be evaluated according to the goals and objectives previously established for those materials, however, one should not limit himself in evaluation to only those goals and objectives. Materials should be evaluated against all relevant outcomes that can in any sense be measured.

Robert Glaser had an experience in programmed instruction when he tried to teach some very young children to tell time. Using cardboard clocks for the instructional materials, he sequenced the instruction very nicely, and came to the conclusion that the children could indeed tell time, and that the program had been effective. Someone decided to see whether or not the children could tell time when they used real clocks, and it was discovered that they could not do this very well. Somehow or other what they learned was limited almost completely to the cardboard clocks. It's more difficult to discriminate a minute from an hour hand when you're using a clock on the wall or a wrist watch. If Roman numerals were used or if no numerals were used, other obstacles would be presented. More extended evaluation indicated that the program was not really successful because the children weren't able to generalize from the cardboard clocks to real ones. We ought to examine the results obtained from the introduction of certain kinds of instructional materials as opposed to more traditional modes of presentation in terms of how learning generalizes.

The second point deals with the relationship of learning principles, or what might be called learning theory to instructional design. In spite of the fact that learning principles do not lead inevitably to the design of materials in particular ways, the two are and should be related. Unfortunately, learning theory exists at a high level of abstraction which is difficult to apply to the design of instructional materials. Learning theory does, however, suggest ways in which instructional materials might be designed through the delineation of concepts such as meaningfulness, arousal, interest, student response, feedback and reinforcement. This enables us to make generalizations concerning the value of certain kinds of experiences in learning as opposed to others, and suggests ways in which we might design materials to accomplish specific objectives.

Some years ago Clifton Fadiman wrote an essay called "The Decline of Attention," in which he argued that people don't pay attention any more the way they used to. In part, I think he is right, because we have experienced an explosion in communications. We talk about an explosion of knowledge, but knowledge isn't exploding nearly as rapidly as the communication process is exploding.

The third point I would like to make deals more specifically with the question of interest arousal and its maintenance. People do not give their attention freely; it must be captured and held. It is important, therefore, in the design of materials, to keep in mind ways to capture and maintain attention. This is, I think, a necessary but not a sufficient condition for insuring learning. It is very hard to imagine any extensive amount of learning taking place if the individual is not aroused and attentive.

We know that maintaining interest is determined in part by properties of the instructional materials themselves, such as color and high technical quality, so to some extent the maintenance of interest and arousal is under the control of the person who produces the material. Of course, there are other variables affecting the problem. Even good materials can't be expected to hold the attention of all persons equally well. We know, too, that very young children don't stay attentive as long as older learners might, and arousal is easier to maintain under certain conditions than others. All these points must be taken into consideration in the sequential operation of instructional systems.

Dennis Sherk - My statement is limited to one of the areas we've been concerned with, and elaborates on a solution which might have high priority. When instructional television is criticized, it is criticized on the basis of the purpose it served (or doesn't serve), and on its quality in terms of production values. Any consideration of quality raises questions concerning adequate financial support to produce quality programs. This isn't to say that television cannot be exciting without a large budget, but money is well ahead of whatever is in second place.

The Public Broadcasting Act, I think, might be able to help us by providing financial support. If we're thinking about changing the image of instructional television immediately, a resource bank or center or several resource banks and centers could be set up throughout the country, where stations and schools could gain access to superior films and tapes, still pictures, graphics, maps; any of those things that might be valuable and difficult to get on a limited budget. Such an operation has to be accomplished on a national level because of the problem of copyrights that small stations and schools can't handle.

Certainly we could benefit by hiring distinguished talent, but that requires money also. To make an artistic production, we would be able to provide what is expected of us and to increase the effectiveness of the product along instructional lines if adequate funds were available for research and production.

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SOUTHERN REGIONAL EDUCATION BOARD - UNIVERSITY OF GEORGIA -
February 8-9, 1968

William Bowden - I am very hopeful that answers can be found to the questions of how to resolve the problems that exist on the national level in planning, development, and utilization of instructional media. There are three things which ought to be done:

1. Locate people for certain critical positions at the institutional, state, regional, and national levels.
2. Clearly formulate policy concerning instructional media, material, and modes at each of these four levels.
3. Make large-scale decisions about planning and standardizing resources, and then integrate them.

Many of the existing facilities can be better utilized, and with the introduction of a few commodities now being developed, a complete system can be built.

Let me first discuss the manpower situation. In terms of structure and function, the elementary schools in this country have the monopoly on elementary education. The same is true in secondary education and in higher education. However, in adult education, there is no one organization which holds a monopoly. There are institutions, organizations, and associations, some of which conduct only one type of program; some, many types of programs. Some are organized in a hierarchy; some are organized on the basis of voluntary membership.

The manpower problem in higher education in the United States, and particularly in more complex institutions, consists of a hierarchy of administrative personnel. The head of the monopoly for all the instruction on the campus is a vice-president for instruction. Another person controls research. There is a vice-president for business affairs, and a vice-president for continuing education services. However, in the area of the planning, development, and use of instructional media and materials, and the implementation of institutional policy concerning media, there is no person currently visible who has status, power, and support behind him, who can oversee the diverse interests and needs on the campus.

There should be developed a manpower component in our educational institutions that is responsible for media development and use. Perhaps each of the major organizations of higher education, such as the Land-Grant Association of State Universities and Colleges, the American Council on Education; the American Association for Higher Education, or the college presidents individually and then collectively should formulate an instructional media policy. The interstate compact boards should formulate a policy of this kind. From this should grow plans and facilities such as those being worked out in the Southern Region by SREB. On the national level there should be an administrative facility which could supervise the plan as it develops and utilize the materials which the group agrees are needed. This can be done if the individual units and the national associations can state in policy terms how much of the educational program can be put into instructional materials.

Every state now has some division for overall governance of institutions of higher education. Policy development should be done at this level for the state system of higher education. On the institutional level, this manpower component would help clarify policy in terms of the individual college or university.

In the matter of technical facilities, perhaps it is best simply to pose a question. When does the next evolution in facilities take place? Does it come with the standardization of a cartridge for 8 mm. film or some such device for standardized use? When do we have available to every student a machine no more complicated than the Kodak instamatic camera which can be held easily in the student's hand, and which can provide any number of cartridges so that he can speedily read a 400 or 500 page book simply by pressing a button backward and forward from table of contents to bibliography? This machine should be battery operated, well-illuminated, and as comfortable to hold as a blackboard eraser. It should cost no more than $4.00 or $5.00. When do we really begin to utilize the wonderful inventions we already have; such as the telephone which can be used for conversing with groups and individuals all over the country and thus bring together the best thinking of many good people.

These three things are the ones I see as critical needs: people, policy, and the use of new technology. Depending on the extent to which we develop these three areas speedily, we will meet the national needs for instructional media, modes, and materials on all levels of education.

Stephen Douglass - My experience has been primarily in the military services, the Air Force, Navy and the Army, serving as instructor, counselor, and supervisor for preparing audio and video tape materials. The specific instructional goal is set by short-term objectives, and we plan our lessons sequentially to reach those objectives, beginning with a small segment of information, which we program, then another segment, until we reach the overall goal which we have set for the unit of instruction. Our short-term objective must be accomplished sequentially and on schedule in order for a student to complete a military occupational speciality in the required period of time.

Whether or not any lessons obtained from the military can be applied in the public schools is a question still to be answered. It seems to me that this system would work very well if applied, for instance, to a five-year program in the teaching of mathematics. The system would allow the designer to break his units down into small segments, each having its own specific behavioral objective. The student must be able to see what we have in mind for him to learn in order to achieve those objectives we set for him.

In the military we use a number of visuals with no distraction, examples which explain the information, and the student participates in performing the skills we want him to learn. Military instruction, as a whole, is built on the principle of active participation and practice, whether it is teaching an administrative skill or demonstrating the operation of equipment. The student must perform a task when he completes the course of instruction. The greater the degree of participation, the more the student retains, the more efficient he'll be performing the required skill after he has successfully completed the course.

Lee Franks - My concern is with the logistics of instructional systems and the ways in which the procedures are designed to support the individualization of instruction. More particularly, I am interested in using the inquiry approach. This is not to say that we will not make provisions for improving other kinds of instruction, but group instruction must relate to individual learning. Involved in this work are these elements:

1. Changing the role of the teacher to that of a learning guide.
2. Development of informational delivery systems, and the use of television, data retrieval systems, and "computer assisted instruction."
3. Production of an abundance of materials in many forms to support the instructional system as it responds to social needs.

This is the overall picture. To understand how the teacher is involved in this configuration, I will use as an illustration one particular kind of programmatic material. The problems that we really have to deal with are these:

1. We must put high intelligence into the development of the system of instruction; employing those people who can do the kind of thinking needed to assess the use of materials in the classroom. I mean that we must determine how these materials are going to be used in a particular content. This is preproduction development, which must involve content relevance, methodology, and related problems, such as the gathering and marshalling of the necessary resources.
2. We must have the right person to direct and coordinate the activities of the entire creative staff. We must follow this line of planning on down to the actual bedrock work of people. This is a crucial problem in any situation, but it is especially important to have the right kind of thinking devoted to planning where a hybrid sort of work is being undertaken.
3. We must seriously plan for evaluating the classroom use and validation of the materials after they are produced.

4. We must direct our efforts toward establishing and maintaining user facilities. User facilities are an issue which needs leadership especially on state and regional levels. Perhaps it should also be approached on a national level.
5. We must find some way to establish and maintain procedures within the framework of our total educational system for delivery and use of good instructional materials. We must work out the kinds of communications and transport networks which are necessary to support a delivery and use system and include the assignment of related duties to supervisors, teachers, and coordinating personnel.
6. We must find some way of training and developing personnel for these different roles. This training would be focused on the teaching function and on the ways of developing the teacher role into that of a learning guide along with the training of other personnel associated with the complete teaching-learning processes. These people would be assistant teachers, teacher aides, and specialists of various kinds. The way in which the student receives and responds to the instructional material is the concern of all of these differently oriented people.

The training of these specialists must be on two levels; the university level, where the training is for the future, and the field program level where the media coordinators actually go out and talk to thousands of teachers. The Georgia State ETV staff coordinators talked to ten thousand teachers last year in various small workshops, even going as far as helping the teachers to plan lesson units. The act of planning lesson units involves all the resources that the ETV network has to offer. The ETV network has worked out a relationships plan and from this activity came concepts about what is needed to back up the plan and which areas are most in need of support.

My main interest lies essentially in the elementary school, but the concepts which I propose would apply equally well to high school and college levels. In the relationships among different kinds of personnel involved in the instructional process, there is a stratification of teachers.

The master teacher is in the classroom, and is really the next thing to a learning psychologist. Assistant teachers manage the handling of inquiries and other functions.

I view television and other kinds of media being used for presentation of lessons at the elementary level to small groups, or to individuals in study carrels, in the same manner as is done in high schools and colleges. The master teacher, of course, controls the classroom use and directs the students into these various modes. The materials could teach music, art, science, physical education, and basic lessons. They could also provide guidance, discussion, evaluation session, and laboratory work. I see the entire undertaking coordinated through this kind of personnel relationships plan.

How do you find a logistical system that supports this approach to learning? The funding for this educational development will have to include support for all units of the instructional system, and it will be a crucial factor in establishing quality education and quality materials.

Joseph T. Jordan - My concern centers on the basic nature of what education is trying to do. I foresee that much of the material used in media-guided instruction will be active in its conception. This means that we must discover a great deal more about learning than we now know in both a general and specific sense. We must continually orient everything we do toward the learner. This is a platitude, but I believe that much of what passes for instruction is not learner oriented. A reassessment of what the school system is trying to achieve will bring the proper place for the media into focus.

The things that need to be done are fairly simple. A role must be preserved for the human being on the scene, whether we call this person a teacher or a resource person, or whether there are other people organized into teams. Certain people are better qualified to do some things than others. The person in the classroom provides human contact and fills a value-giving, value-changing role which has always been attributed to parents, teachers, and other professional people in our communities.

He can transmit practical ideas and attitudes which are relevant to the lives of the boys and girls whom our system of education is developing.

This interaction takes place mainly during the process of applying teaching skills. Much of what has been taught in the past as concept will be transformed by the learning processes into a skill producing sequence. In this way the student will not only learn values, ideas, and concepts; he will learn to apply them and will achieve some degree of proficiency in these areas. The systems approach becomes an absolute necessity when learning objectives are established on the basis of life needs.

Education in the past has tended to be somewhat antagonistic toward any type of outside intrusion or participation. I think the time has come when education must join with industry, business, the general public, and the government at all levels, in order to overcome some of the traditional and hampering influences. Business ought to begin to realize that it can use a product from the educational system, but before this can become a reality, it must take an active part in that educational system.

Obviously, the contribution industry must make is not money alone. It has to do with training people; it has to do with access to on-going operating facilities in which the boys and girls who graduate from our schools will eventually work. It involves travel opportunities, perhaps at some reduced rate, and the products of business which can be studied at close hand by the students who are trying to understand them.

Students who are trying to establish some kind of life pattern for themselves are forced to select from among many opportunities, some of which are conflicting. Media people have hinted that the answer to this problem lies in the use of their products, videc-tapes, or audio-recordings, or a programmed texts, or computer signals.

I think that this is short-sighted. I believe a systematic study will disclose that a student learns best by doing, and the materials he is working with must be in his hands whether he is in his home, in a classroom, in a seminar, or in an on-the-job training situation. Many of the instructional materials I am thinking about will need to be cheap, but they will have intrinsic value for the student. This concept of the instructional uses of materials opens up the possibility of a student appreciating the tangible units of his learning.

I am concerned with the new dimension in education, the occupational and professional dimension. We are educating people who are not at home in the world they live in, who are not familiar with the materials and the living things of their environment. Biology is a particular example of teaching a classification system with a curriculum guide, which results in children studying frogs in the winter and birds after they have migrated to the South.

Educational planners must accept the burden somewhere along the line and make learning economically feasible through training situations. These training programs will have to make a contribution which represents a profit to the people whom we are seeking to instruct. The kind of program I have in mind will be costly. Whether we like it or not we are working in a world involved with fiscal and administrative requirements, contingencies of time and space, and other restraints. The responsibility of the planner is to make a better contribution, one which people from many disciplines will be able to examine and to conclude from their observation that the system does achieve its specified goals.

Joseph Mingioli - My experience has been limited to the specific field of television in the medical profession, and my observations are not those of an educator but of a man who has been exposed to the errors of the educational process and who has perpetuated some of those errors. From this standpoint, I have observed that there is a great amount of duplication of basic core material. The time which has been spent in the planning, production, and promotion of this basic core material might perhaps be better spent in other areas related to it, not in replicating the same courses.

I feel, for example, that there should be a central source for instructional materials. Perhaps this source could be a governmental agency or some other educational entity. From this center would flow basic core material which would be applicable anywhere in the country and which could be altered according to local needs. This would eliminate the present waste of time, money, and perhaps most critical, the squandering of individual abilities.

My second observation is of the critical need for specialized personnel which, in turn, means specialized training, a development that is now in an embryonic stage. Training programs must first be developed to educate specialized personnel.

The third observation is of the need for the creation of new, or the exploitation of existing think tanks for the purposes of the advancement of instructional communications. In the multi-disciplines all three levels of education, elementary or secondary, university or graduate, are distinctly interrelated through specialized people with specialized training, who need to call on pools of exceptional intelligence. The specialists could draw upon this resource to apply and make available the basic core material for the master teacher, who could implement instruction within the structure of the specific course being taught.

Often the on-camera instructors are not fully acquainted with all aspects of their own subjects. Even though they know their material, they are not sufficiently acquainted with the problems of television potentials and techniques to be able to convey the right kinds of information to me as a producer so that we can work together. It is wrong to point to the tape or the picture on the screen as the single source of error. It is more likely to be the compounding of several sources of error into one focal point, and perhaps everyone concerned must share the blame; the teachers who have not fully utilized all available resources as well as the producers and technologists.

Why a lesson is of poor quality is a basic question. The specialists, the administrators, and faculties at all levels must receive proper training and must keep well informed in order for efficiency and quality to improve. If we are all ten years behind the times now, we may be much further behind in the future because we are living in an era of such rapidly expanding technology.

THE PENNSYLVANIA STATE UNIVERSITY IV - February 12, 1968

Kenneth R. Beittel - I will discuss two simple concepts. The first point is that we do not want to eliminate the present system of defining strict behavioral objectives, getting feedback and improving from that standpoint in cybernetic fashion. We do want to form instructional units of a wider scope because we don't know how to analyze our behavior into elements because of its complexity and integral character. Everything that has to do with our cognitive, attitudinal performance makes sense only as a series of related acts, and should be researched and produced with this fact in mind.

The other point is that the media are extenders of mind, that the mind is plastic, imagination is plastic, and media provides exciting new dimensions by helping us to re-define our objectives and to give us new ways of formulating our problems. How do we use the media to stimulate creative thought and action?

Delmer P. Duvall - The quality of television programming can probably be substantially raised by the increased use of pertinent motion pictures. Film is occasionally used to illustrate, amplify, or clarify a point, but seemingly more often to fill up time with only incidental application to the subject. Furthermore, the movies now available are generally prepared for widespread usage. Thus they contain much generalized material and a minimum of specifics. They are generally like an introductory lesson or chapter one of a general textbook.

General films have their value and should continue to be used. My suggestion is to expand the use of fragmentary or "target" films, each presenting visually a small segment of information, a single concept, an example, an experiment, or parallel or contrasting illustrations designed for particular targeted learning. None of the films would be complete films in the theatrical sense. Titles and credits, for example, would be limited to brief identification only, generalized introductions and summaries would be omitted. They could be silent or sound, and long enough to convey the message, whether it requires a minute or an hour. Thousands of such "targeted" films appropriate for many disciplines should be produced, catalogued and made readily available. Teachers and programmers would select from one to dozens to add visual impact to instruction.

Films are not proposed in areas where television programs excel but rather in areas where there are shortcomings. For example, films are useful for high speed and time lapse studies, current events where small cameras and mobility are necessary, distant location photography, research reporting, or the many subjects requiring detailed editing for clarity or time condensation. When films are to be integrated into instructional programs, longer production lead times are necessary. Appropriate films must be located and scheduled and non-existent films must be made.

High quality film making requires a variety of expensive equipment and skilled professional personnel, neither of which is apt to be available to the average instructional system. A regional or statewide Instructional Materials Production Center should be established to produce films and related materials, and to maintain a library of such, together with a complete catalogue of available materials. Here would be the source for materials for teachers and educators preparing to video-tape courses. Such centers could be established most economically by enlarging existing facilities in universities where there is already a large corps of skilled motion picture personnel, where large film libraries are now functioning, and where resource people representing many curriculums are available.

In order to insure rapid and wide acceptance of high quality "targeted" and other films, they should be made available at little or no cost to the user. Federal and state subsidies should support the service including even travel and lodging expenses while potential users prepare programs at the Center.

Generous use of targeted films integrated tightly into course content will certainly raise the quality of programs. But what can be done to heighten the visual impact? Perhaps most important are visually oriented people. Most teachers are strongly audio-verbal oriented, and film making educators and teachers often make hesitant and tenuous suggestions about picture or visual content but will wrestle for days or weeks over the exact wording to explain a point.

To remedy this situation, training should be conducted for all teachers who may help make films or video-tapes. The importance of visuals would be stressed. Experts from TV production, motion picture writers, directors, technicians, and commercial advertising agencies should be heard. At the end of the training period the student-teachers would know how to think visually, how to present their subjects graphically, and how to discern between flamboyant and attention holding techniques. They would gain a basic understanding of the scope and limitations of production equipment and methods. They would be familiarized with editing possibilities and other special display techniques such as time lapse and high-speed photography. After experience with four to six such training periods, motion pictures summarizing the most salient points should be made. In the future, a few hours spent viewing the films could stimulate any teacher preparing for a VTR session toward more and better use of visuals.

E. A. Hungerford - This paper will suggest two or three factors which might contribute to an improvement of the quality of instructional materials including films, video-tapes, audio-tapes, printed materials, and combinations of these. The first topic under discussion is film.

The quality of films tends to be very high, considerably higher than most video-tapes. The film medium remains the most practical way of handling good color, at least until the color television system becomes more consistent and color video-tape machines and cameras become more reasonable in cost.

There are probably two main problems with film. (1) An old film never dies but continues to be listed in bulging film catalogues year after year. (2) The distribution system for educational film is archaic. It acts to restrict the use of certain films of high quality due to the clouded rights situation in connection with their use in televised instruction.

The former problem could be solved in part by disregarding nearly every educational film with negatives dated before 1950. If a choice had to be made between spending time gleaning through the millions of feet of obsolete film and choosing an arbitrary date before which gleaning would certainly be marginal, I would suggest the date of 1950.

Technically the film medium is fully developed and interposes very little inherent limitations upon the scope of instruction. Consequently any significant improvement in quality must arise from better working relationships between the educator, the researcher and the film technician. Film lends itself to this regimen better than video-tape because film is a medium of perfection. Costs are high. Production speed in terms of quality is slow. The final project can be coaxed into being with more precision and care than is the case with television techniques which are comparatively crude.

Another facet of film which could have a very large impact on the quality of educational presentations has to do with the blending of television and film. The techniques of television are fast. It is easy to up-date material by videotaping a new segment, while retaining older material which has not been out-dated. This combination is a valuable one, because much material of enduring value is on film. Yet the surrounding material may be quite dated and tends to vitiate the value of the film itself. If the particularly good parts of a film can be extracted and combined with new segments of video-tape, the combination can result in a quality product. The problem rests in securing the rights to use filmed material in connection with the production of composite video-tapes. The film owner often places too high a value on his filmed material and thus restricts its use because television is a cheaper medium. For this reason, the best material often remains in out-dated films which bring no revenue and are seen by few students, while inferior and cheaper material abounds on video-tape.

In order to solve this problem, some better way of identifying desirable film sequences must be developed. Perhaps computerized data storage of descriptive material on particularly significant film sequences can be justified. To avoid being deluged by sheer quantity, we should arbitrarily begin the indexing with 1950 even at the risk of overlooking some good material produced earlier. If such materials are notably good, someone will remember and the exceptions can be catalogued as well. If this system can be devised, then we need to have a central clearinghouse for securing rights to such film material, either to make new films or to incorporate others into video-tape presentation.

One other area of film technology which has much value is the single concept film loop. Most of these loops are on 8 mm. stock without sound and specially aimed at small children in elementary school, but are also being used in higher education as well. This brings us back to the idea of quality in film materials. Too many times the most important footage of a film is surrounded by irrelevant or superfluous material. If the single concept idea can be extended, we could have myriads of film clips of the enduring parts of old and new educational films which would have great utility in their own right and additional utility when combined with more topical video-tape presentations which can be changed each year if desired.

Film and television are essentially one family. Both are audio-visual and both have certain unique values. They should be used in combination to produce the best in quality educational materials. Solving this problem will make a very important contribution to better instructional materials.

The non-theatrical film distribution system poses another problem. This system often prevents the convenient use of many films in school classrooms distributed by television techniques. In effect, students are denied many instructional film materials of very high quality. For example, Penn State's Audio-Visual Library contains thousands of films, but in most instances these prints are for projection only on standard motion picture projectors in the usual way. Most of them cannot be distributed to our far-flung network of television-equipped classrooms without more payments or special permission or both.

Film producers adhere to an unfortunate distribution system which, until recently at least, has relied principally on the purchase of a print by a school system. With the purchase went the right to show it on standard projectors until the film wore out. We need more modern methods of film distribution. The archaic procedure of print purchase doesn't work. We should be able to televise one print and even show it nationwide by satellite. In the past, a fairly close relationship existed between film usage and audience - the average print might last for 500 showings to average groups of 20 and thus reach 10,000 students in its total life. This aggregate audience was inferentially related to the price charged for the print. Now we can vary from that pattern with the possibility of one print being shown simultaneously to millions. The former film distribution system has broken down. Naturally, film people have been unwilling to allow unlimited TV distribution, but they have yet to come up with easily administered rules which make it attractive to use their products. Rather than contend with the inadequate rules, many educators decide to remake the material on their own film or video-tape and thus control the process themselves. Unfortunately, the films are often the best educational materials and they are often addressed specifically to troublesome parts of a teaching unit, because films are too costly to make just for routine purposes.

If the educator and the film maker can come to a practical agreement on universal use of the product, we will experience a real breakthrough to higher quality.

Improving the quality of video-tape involves cutting down on quantity and concentrating on fewer and better programs. A complete course of televised materials, especially where the main pedagogical reliance is placed on such materials, is wrong in theory and in practice. Few, if any, materials should be supplied which duplicate what the average teacher can do as well himself. Many video-taped series are not used because good teachers don't want to rely on televised teachers doing no more than they can themselves. One criterion to be applied to each series is- "Does it use materials and presentation techniques which are notably more effective than what the local teacher can do?" If not, don't use it.

Another criterion must be improved quality in the materials themselves. Even if the presenter in a televised lesson uses materials which are not available to the local teacher, we still must question whether these materials will in fact contribute anything additional to learning.

Too many video-tape presentations are made covering subject matter which has already been produced on film - and probably better than can be done on television. We have to learn to make maximum use of available materials in order to produce a favorable cost ratio. Where good materials are available on film it is impractical to make new video-tapes, even good ones.

Video-tape has some technical problems which cannot be improved by over-economizing. Television is a medium of relatively poor technical quality. The best of television equipment produces barely acceptable results. Anything less tends toward totally unsuitable productions. Television should not be singled out when economy measures are taken.

Another problem involved in the effectiveness of both film and video-tape is the problem of access. We don't utilize modern distribution techniques the way we should.

We tend to confuse the use of mass media. For example, we still assemble people in auditoriums or classrooms to see televised instruction or movies with no teacher present and no reason to assemble the class. Students should see films and video-tapes in their rooms, their lounges, or in carrels. They should come to classrooms only when there is interaction between students or between students and faculty. Why not pipe television into all dormitory rooms routinely? It might cost $300 per room spread over seven years - about 16 cents per day. These materials should be available on dial access like the language lab. Consider the savings of time. Now dormitory rooms are empty during a large part of the day while students crowd classrooms to be lectured to or to view films or TV. We should feed these items to students' rooms, lounges, and to library carrels and use the classrooms for interaction education only.

Professors should make audio-tapes of their lectures, if they continue to give such, and these should be available by dial access or at least from library sources both for purposes of review or for those who might have missed the original.

In conclusion, to achieve better quality in the various technological aids to education often involves an improvement in detail. But there are other factors of kind, such as better blending of film and television techniques and materials, freer access, etc. Solving these problems requires concerted effort on the part of educators and producers.

Edward Leos - The use of slides seems to be an area which should be attended to in connection with the use of visuals as teaching aids. Most of the technical problems which are presented are seldom difficult to solve, and even the more stubborn problems will often yield to a modest application of cash and finesse. The most disturbing problems are not brought to the visual aids people intentionally. They arise from the differing orientations and experiences of the visual producer and the basically verbal teacher. They are problems of communication, but they are intertwined with the technical ins and outs of slide production and use.

A change in any one part of slide-making and slide-viewing practice could affect the whole structure. A purely technical proposal concerns improving the quality and ecomony of a slide-making operation by requiring that all material to be converted into slides be submitted on a standard art-layout form. This is not an entirely new practice, and a slide maker would quickly see some advantages:

1. A simple copy set-up and a semi-skilled operator could accomplish an enormous volume of work.
2. Problems of format, safe-edge, letter size and the like would be minor. Drawn out conversations with unprepared clients would be eliminated.

The slide maker would also have some drawbacks:

> A standard artwork form would be inapplicable to the making of slides from books, periodicals, letters, maps, clippings -- the whole range of current copy from other media which an instructor would like to be able to show to his class.

At this point the slide maker would remind us that slides are legitimately used for a variety of purposes outside of the formal and relatively inflexible slide sequence.

1. Slides can present current printed material for group viewing.

2. They can present, for group examination and criticism, the visual work of students and professionals.
3. They can illustrate talks just as pictures are used to illustrate articles.

Some may regard these uses as secondary or incidental, but they should certainly not be eliminated. We are not obliged to choose one or the other. We can find a common meeting ground by accepting the notion that a standard artwork form be adopted for all original material specifically designed for use as a slide. How might this improve slide effectiveness?

1. A well-designed artwork form would provide the artist with guideposts to verify the effectiveness of the completed slide.
2. It would discourage the crowding of excess information into the limited slide area.
3. It would encourage the increased use instead of slide sequences to explain complicated processes and concepts.
4. Legibility and effectiveness in communicating ideas would be improved by a form which refused to expand, enforcing concentration and economy.
5. Most important of all, it could encourage the increased use of professional visualizers who were trained to meet the challenge of the slide medium's characteristics.
6. And, related to all of the above, it might result in an increased awareness among slide users of the unique potential of the slide and the projectual to explain, through visualization, processes and concepts for which words alone are not enough.

This proposal to establish and to encourage the use of standard artwork forms for making original slide material will effect only a limited improvement.

The teacher is responsible for the present wide-spread and often indiscriminate use of material unsuited for screen viewing by students. How can we improve his understanding of how to use slides effectively?

We need not train the user as an artist or technician. His role, and his strength, is as a user. His training should include an experience in the use of slides in teaching. A survey of the various kinds of slides and projectors is not enough, nor are one or two practice presentations sufficient. What is needed is a directed internship in which he may explore the broad spectrum of effective uses of slides. By preparing and delivering eight or ten slide presentations, followed by critiques, the teacher could become a relatively sophisticated slide user. Again, the effects of this step would not stop with the teacher. A well-prepared and experienced teacher would be a great help to the visualizer-producer. He would provide "feedback" from the classroom, and could be a good source of working ideas. He might also become more demanding of the artist and others who assist him.

A third proposal would be to encourage exploration of creative skills employed in teaching through the audio-visual media. We have begun to meet the challenge of finding how to use most effectively the techniques, products, and approaches that exist through learning research. Innovation in equipment and products continues at a pace too fast to absorb. Innovation in techniques and approaches, however, has by no means kept pace. This is the special potential of the user and producer--the teacher and the artist. Tapping this prime source seems to be a matter of providing time, training and freedom to explore all possibilities.

Creative capacity and desire is quite compatible with the capacity and desire to teach, but the teacher will be inhibited as a creator by the formal organization and requirements of the school; and the artist will be inhibited by the never-ending volume of work representing visualization limited to the ideas of others. Our potential innovator should be an outsider, freed of duties and formalities which are extraneous to actual production. The opportunity to work under favorable conditions might attract a proved talent from the outside, or we could remove a staff or a faculty member from his present position and effectively make him independent and free-ranging. This could be made a rotating arrangement for many staff and faculty people.

The roving appointee might be offered a list of problems or projects, but be given the choice of the ones to undertake, and his methods and his progress should be subject to a minimum of administrative review.

In return for this freedom and support we could set a time limit for his undertaking, and require its production so that others might constructively criticize it. We should expect that the result might not be of immediate use, or that a good, solid, standard product would be all that we would get. Or we might be fortunate in uncovering an exciting new possibility. The bedrock value would always lie in the availability of the work for study by others. We must free the administering authority of any responsibility beyond this. In short, an opportunity for research and development work should be provided for the creative visual explorer.

Edward Mattil - In questioning the effectiveness of any educational technology or procedure, we should guard against accepting any untested assumption as truth, and we should devise some means of testing our premises before we act on them. All too often many poor ideas are put into effect without question or review, resulting in poor programs.

It might be worth examining the regional development centers for the production and distribution of instructional media. We are duplicating much mediocre material in many places, and we ought to find the organizational means and resources to bring these together, and to develop standards which are considerably higher than those we are now using.

Another factor affecting quality is the question of free or easy access to copyrighted materials. There is a wealth of existing material which is virtually inaccessible to teachers, but which could prove very useful. Perhaps a regional production center could eliminate some of the accessibility problems.

We should study carefully the television instructional techniques that are being used by people who are not primarily concerned with educational television. Educators may have something to learn from some of the most effective TV commercials. In terms of teaching effectiveness there might be many shortcuts which have been developed by people who are not thinking in terms of being educators, but who, nevertheless educate the public to a product or method.

In time, a system like the ERIC storage system sponsored by the Office of Education could be developed to help people compose programs based on their own needs, and using all types of material available, rather than utilizing entire pre-planned programs. Pre-planned courses will be resisted on all levels of education by teachers who are not willing to accept a curricular aid or course material that has been produced in another institution.

Perhaps not only the teachers but the viewers as well need special kinds of training which will help them maximize their understanding and retention of what they are viewing or hearing.

Finally, I think that the suggestion made about the development of models would be very useful for developing materials that could be widely disseminated. People would not feel that general models were imposed on them, and they could gain considerably from having general models to guide their efforts. These are a few of the ideas I consider important.

FLORIDA ATLANTIC UNIVERSITY - February 22-23, 1968

Franklin Bouwsma - We are, at Miami-Dade, a large junior college campus grouping in the Dade County area formed to handle the needs of Dade County in three respects:

1. We provide the first two years of higher education for the majority of students in Dade County who intend to go to college.
2. We are developing a base for the community in various higher education technical-vocational programs.
3. We serve as a resource center for the adult community.

We see the operation of learning resource center and the operation of the classrooms in terms of media. Laboratories are based on the idea that there can be a total library available to faculty and students at the point where is is needed when it is needed.

An interesting feature of our program is that we have had to develop a utilization specialist in order to encourage the use of media. This is a rather new area and describes the different media forms available to the faculty when the faculty presents a potential program for development. The critical point for us, in any utilization, is a design for faculty involvement, an attempt on our part to provoke faculty leadership and innovation. The faculty must be made aware of potential innovative projects, but they must also agree to be responsible for their utilization. The faculty also agree that they should attempt to insure that the student will learn. Any production facility must have a certain flexibility which will allow it to lead in the production and utilization of media, and also it must have a high degree of flexibility because the utilization of the facility will surely change over a five-year period. We know that any production facility designed at this time should be multi-media in order to ensure maximum utilization by the faculty. We suggest that no one media will win out, and the use of the different media by the college will grow from within.

We find that curriculum redesign is a continuing process at Miami-Dade, and this activity is a natural place of tension for beginning innovative projects. In terms of content analysis or behavioral goals, the potential project must be discussed within the *academic* framework of change, not within the *administrative* framework of change. It is also necessary to determine which media cannot perform a particular role well so that they will not be forced inappropriately into a use by faculty request or by the production design. We believe that we are finding that the new independent study and student instructional *clustering system* of small workgroups will tend to define a new faculty interest in the utilization of material and in their instructional interchange with students. We also believe that all of the designs of media and facilities for them could be accomplished at the present state of engineering so that there is a basis for future development as time goes on.

Utilization and distribution systems no longer limit quality as they did four or five years ago, because there are new techniques of change-over of material from one system ot another, so that in the long run, there will probably be a varied collection of equipment and material available as a total library throughout the instructional facility.

Kenneth A. Christiansen - As a television director at the University, my responsibility is to provide, through the facilities at hand in the college of journalism and communication, a service arm for the university. My role is not defined specifically in terms of a learning resource which is trying to develop new techniques through research, but as an examiner of the special opportunities afforded by the communications media for education.

Looking at the total university, we see our services used for the extension of teaching and research, and we view the distribution devices from a communications standpoint. If it is a matter of extending the informational arm for a course or courses, we try to convey an idea of what the materials do in the classroom, because the best way to communicate the function of a university is to let the people see what a university does by means of the broadcast media. My concern, therefore, does not lie with the elegance of the course simply as a production element, but with the ways in which it enhances the university's mission as it performs its role as a teaching institution in Florida and the South.

From this standpoint, we begin our work with the teacher somewhat differently than we would if we were concerned simply with modes of presentation of instructions. I think that in this case we must require more lead time because we must go through the patient job of understanding what it is that a teacher is doing in order to translate it into a communications medium. The job could be done in much less time by simply asking a man what he wants, then translating it into a program. I think however, that this approach does not allow us to understand each other's mode, motive, and purposes; or to relate these to the role of the university.

In terms of performing these functions, I like to be able to make some of the recommendations with respect to the kind of resource personnel and resources that are necessary because I think I understand the communications role. I also must be willing to stop with a simple two-minute slide presentation if that does the job, instead of being committed to a budget situation in which I get a transfer of funds for producing fifteen thirty-minute programs. We must learn to stop at the point when the necessary communication has taken place, or we will entirely fail to understand the message we have been asked to communicate.

The next question to ask is, do you have a role that you want us to help you play with respect to your staff and professional colleagues? Often the role we can play in this respect does not only take place in a classroom but it may occur in the realm of GENESYS which is an extended part of the university.

Robert Gaither - I will discuss those areas of the problem of quality that are of interest to me as a faculty member concerned with graduate engineering education.

GENESYS was begun in response to an established need for graduate engineering remote from the university. It is primarily based on the idea that effective and more widespread distribution of instruction can be obtained by using this micro-wave-cable distribution in a live form. Very heavy reliance is placed upon "talk-back" features of this system. It gained the acceptance of the faculty primarily on that basis.

Any program utilizing the electromagnetic media needs to be started in a content area. At least, in our case, it had to be started where no teaching innovation whatsoever was required of the faculty, but in fact, all of the innovative aspects of GENESYS were developed by faculty who felt responsible for filling the need for graduate engineering education in the east-central Florida area.

One factor to be considered in implementing such a program is the need to recognize the vested interests of a faculty, university, and the state. I think that time spent in learning the new means of improving presentation in general is nowhere nearly as important as the time that they need to spend for developing competency in their special subject areas. Television production people are therefore going to work hard to involve the faculty. Professional people such as engineers or doctors are not concerned with the elegance of their instructional presentations. They want to remain the "top men" in their content field, or work to achieve that status.

Finally, I think that we need to concentrate on the idea of meeting an educational need. In the development of quality, television or any other particular media should be utilized to solve certain aspects of a presentation problem that could be solved otherwise.

Harvey K. Meyer - I am the Associate Dean of Academic Affairs at Florida Atlantic University with responsibility for the learning resources area. Here at Florida Atlantic the use of instructional media is considered to be very much an academic affair. The human factors involved are really very much what has been discussed all the time. I would suggest that, off the shelf, there are devices which will do almost anything we ask them to do. The critical matter concerns what we ask them to do, and whether they can work for us as effective tools. Much of the time they can, but it is the human factors that must come first.

In the United States in general, there has been a great tendency to begin an instructional operation with the hardware, but the most significant factors that we are dealing with are not the tools we use. I believe it was Spengler who said, "The tool shapes the hand as the hand shapes the tool." I would like to give an example of that statement in terms of media usage in the commercial field. We are experiencing the first living room or cocktail hour war in history, and whatever our views of the affair in Vietnam, I can say without fear of contradiction that they are formed in part by the fact that we sit daily in our own living rooms experiencing death, destruction, and the other things that go along with war. This is the most powerful sort of teaching, and it is certainly a cliche to point out that this kind of instructional power has not been used in a very conscious way in the educational world. This brings us to the quest for quality, but I would first ask the questions:

What exactly is quality?
What criteria do we use to judge quality?

If you have no technique nor device for testing quality against such criteria once you have them, the quest for quality is a fruitless one.

Unfortunately, a great deal of the talk about quality has been in relation to the cost factor. The more subtle and important question concerns whether or not we actually convey information or produce behavioral changes. It is usually difficult to decide whether a behavioral change has taken place, so this criterion is often ignored. Occasionally in the area of media utilization, successes have been far more inadvertent than anything else. It has been evident in our discussions here that we wonder sometimes why something occasionally succeeds very well although it is not technically perfect.

These questions relate to the human factor that I mentioned earlier. As far as the university is concerned, we must concede that it is nothing more than a system of relationships and interactions, whether they be student-teacher, administrator-faculty or whatever. I would only point out that the state of the arts has been often advanced by enthusiasm in terms of its teaching effectiveness rather than by logic or reason. Sometimes cold logic fails to exhibit that touch of enthusiasm which is an essential part of creativity.

Up to this point we have had to be content with plural and partial solutions. With many ways of looking at the entire problem and with only partial success in any one of them, no one of us can be satisfied. I think that if we are going to use media we must accept the service role, and we must do it in this way: We must use a broad spectrum of devices, we must use the simple first and proceed to the complex; and we must always use them as tools under human control. In order to do this, we must provide support to the faculty in carrying out their teaching roles. Finally, we must keep the student in focus. I maintain that this last can be very specific. It is possible to have clarity of function and it is possible to discover whether the learner has learned what the teacher intended to teach. We must state the objectives we want to accomplish, and evaluate our results in terms of individual performance achievements.

S. E. Wimberly - I represent the academic part of the program of Florida Atlantic University, a new university now in its fourth year of operation. The most important point to resolve in the entire area of the development and use of instructional media is the gaining of faculty understanding and acceptance. Our approach to this problem seems to have been successful at Florida Atlantic, and I would like to describe the essential features of the approach we have used. We have presented the problem in terms of our inadequacy to meet the needs of the growing numbers of students seeking a college education. There are not really enough qualified university teachers to instruct students using the methods that have been used for the first half of this century. In regard to this, it seems that two main reaction patterns are developing.

One of these seems to be an intention to settle for less qualified teachers. Many programs in higher education will inevitably choose this path and American education is busy developing appropriate rationalizations for this kind of action. The Ph.D. degree has been subject to sharp criticism because of its research emphasis and many indications can be found in the present literature to the effect that the university is inappropriate for the preparation of college teachers because of this research emphasis. Discussions of more appropriate degrees are frequent.

The one most often referred to is called the Doctor of Arts. Invariably the proponents for this approach point out the advantages of educating a greater number of people. I think that the factor of lower quality is clearly implicit.

The second pattern of reaction to the population pressure is to extend in space and time the abilities of qualified teachers using all of the varieties of instructional media and technology that are appropriate. Florida Atlantic University is developing along this second line of reaction.

The major problem, in our experience, was to secure the cooperation of the faculty. This university has succeeded in its three years of life beyond our expectation in involving its Ph.D. level faculty in the use of instructional media work. Second, and perhaps most important, the university has been, from the beginning, most careful to insure that a large part of the profits from the use of media are returned to the faculty. The products that resulted from the use of media made possible-

1. Increased time for course presentation
2. Increased time for individual student conferences
3. Unusual assistance in developing course materials from the staff of the department of learning resources
4. Increased time for research on the part of the faculty.

These are the shared profits.

Whenever possible, the requirement to adjust methods and procedures has been placed on the technical learning division staff rather than on the faculty. We have, for example, required technical personnel to translate normal classroom procedures into instructional media and materials by using the "candid classroom" technique. Another important factor which has been responsible for the acceptance by this faculty of instructional media has been the level of support which the state has provided for this university. Our budget mandates the use of instructional technology.

We are now at the point where we expect a significant increase in our support budget. The indication of the level of success Florida Atlantic University has had in involving the faculty with instructional media is best illustrated by the fact that about 90% of our faculty now perceive the increased state support, which we confidently expect at the beginning of the next biennium, not as a device which will permit us to drop the use of instructional media, but as a means to permit the research and development work which all of us recognize we must do to improve the quality of our instructional program.

Robert Wood - I shall comment briefly on requirements for improving and conditions for improving the quality of instructional materials:

I. A concerted effort should be made to centralize the production capabilities for all instructional materials at the state, regional and national levels.

    1. The production of high quality instructional materials is an art in itself whether it be in the form of video-tapes, films, audio-tape, computer assisted instruction or programmed learning.
    2. In the field of instructional television every facility, whether broadcast or closed-circuit, should think of itself as a quality production organization. The fact is that the large majority of the existing installations in institutions are incapable of performing this role for several reasons:
        Lack of qualified technical personnel and equipment.
        Shortage of creative production talents.
        Lack of imaginative, creative, and communicative television instructors in subject matter areas.
        Extreme limitation of funds for television production.
    3. The above limitations apply to all kinds of instructional technology.
    4. Commercial television networks were faced with this same problem several years ago but the problem was solved by centralizing production facilities in New York and Hollywood, except for sports programming. Concentrated in both these cities are topnotch technical, production and studio performers. Little if any programming originated for network distribution from the other television facilities in other parts of the country.

5. It is doubtful if educational television will ever reach its deserved zenith until centralized television production centers are established which have available highly qualified technical and production staffs as well as educators who are masters in the art of communicative skills. Such personnel must be paid salaries comparable to those paid to personnel at commercial networks. In addition, the TV teachers must either be paid top salaries or be given the opportunity to receive equitable compensation when their material is utilized on a regional or national basis.
6. The production centers should be established first on a state basis. I would visualize that for higher education such a center in Florida might be at Florida Atlantic University, due to the size and quality of its studio complex as well as its modern television equipment. This would be the beginning phase, for it is obvious that one facility could not meet all the requirements for a state-wide higher education program. Concurrent with the establishment of this facility at Boca Raton, another installation should be constructed in the state, and preferably one which has capability for color production. Thus we would concentrate our efforts at these locations for all state-wide university programming. Materials for education for K-14 levels could initially be centralized at an installation such as Broward County due to its modern facilities and equipment. Furthermore, due to the close proximity of Florida State University and Florida A & M University and the Broward County facility, an exchange of personnel and equipment would be possible during the initial stages of the project.
7. State-wide and perhaps national searches for competent technical and production staffs to service these facilities would be necessary.
8. A regional facility such as Southern Regional Education Board should be established to help service higher education and the K-14 requirements in those subject areas which are of a regional

nature. The same would apply to national centers. They would produce and distribute instructional materials of a general nature which would supplement the materials produced at state and regional centers.

9. A clearinghouse should be established at regional and national centers which would identify plans and programs and disseminate information to assist each state and prevent the duplication of effort.

II. The emergence of new technological developments for display of instructional television programming will radically affect the distribution concepts for this medium as well as make it possible for educational television broadcast stations to transmit programs in color at minimal cost.

1. There are several organizations which are working on new methods of distributing television signals such as Columbia Broadcasting System Laboratories with its electronic video recorder, the Radio Corporation of America with a new type of film, and Westinghouse with its plastic record. The former may be available in the near future. The Educational Technology Department of CBS Laboratories was involved for two years on the various planning and utilization phases of this project. There are two aspects of this device that should be explained, the EVR, electronic video recorder, and the BEVR, broadcast video recorder. Both are designed for color programming although they may be used in the monochrome mode as well.

2. The electronic video recorder programming can originate in the form of color film, color video-tape or from a live color presentation, and then be converted electronically to a black and white master film print. One 20-minute educational program can be printed in approximately 30 seconds by the EVR high-speed multiple printer, which generates multiple EVR film cartridges from the EVR master. Attached to a standard television set is an EVR player, or reproducer, into which the cartridge is inserted. The electronic signal goes through the

television set, and the picture is displayed on the screen. The cartridge is fed automatically and the material can be "stop-framed" as desired. This device will make it possible for each classroom to become its own origination point and nullifies the requirement for additional television channels.

3. The BEVR originates the black and while film material in any of the above methods but at each broadcast station an EVR camera is used along with a conventional 16 mm. broadcast studio projector. The EVR camera scans conventional black and white EVR film and transmits a high quality color signal equivalent in quality to 35 mm. color films. The cost of the BEVR camera is estimated at $20,000 which means that an ETV station could originate a color signal at a very low cost compared to the cost factor of a color video recorder.
4. Estimates on the cost of the EVR player attachment for individual classroom use is $300, and the costs for converting materials to the EVR cartridge will be equivalent to introductory prices for long-playing phonograph records. Another advantage which should be considered is that EVR copy is ideal for archival purposes, for it retains its original quality indefinitely. It should also be noted that the EVR cartridge lends itself ideally for computer dial access systems due to its cartridge format. It should also be stated that the costs of making color prints are reduced by a factor of from six to eight using this new process.

REGIONAL EDUCATION LABORATORY - THE CAROLINAS AND VIRGINIA
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Samuel A. Agnello - There is no doubt in the minds of the faculties of at least 80 of the 94 medical schools utilizing media that television is a useful medium for establishing a fine environment for the learning process. The areas in which this medium is used cover all subjects of medical education. None of the schools that are now using television have such things as whole course materials on tape or on film which is then distributed. Television is a supplementary aid, with the possible exception of its use in continuing medical education. Perhaps this is where the broadcast medium fits health training most appropriately. The facts and figures that I have been able to gather from people or publications about continuing medical education programs show an unfortunate condition because only about ten percent of the possible audience has been reached. There are a number of reasons for this, one of which is the quality of present programming. Another reason is the fact that broadcast television lends itself only to a specific time slot when physicians are busy and may very well miss the program they would like to see.

I offer a suggestion to the industry, and that is to make possible a very good, low-cost, high-quality video tape recorder which can be put into homes to automatically tape programs which can be viewed later.

I think it has been well established that medical continuing education programs are effective when produced properly.

There are not many good ways of determining effectiveness, however, except for sending out questionnaires. Campbell Moses at the University of Pittsburgh has proved the effectiveness of media in one area: He made a study of a report on the incidence of venereal disease in Allegheny County during the year previous to a program he was planning. He found that there were 50 to 75 cases reported in one year. In order to find out whether he was reaching people on his program, he suggested during the program that such cases were known to exist and should be reported.

Within 60 days after the program, around 75 cases of venereal disease had been reported, so he knew that he must have reached some of the viewers.

One thing that the British Broadcasting Corporation fails to do, and they have done some of the best educational programming that I have seen, is to refer the target audience to other media, such as journal articles, books, and other backgrounds. Some studies have been conducted on the effectiveness of this technique on the basis of library circulation after the programs have been aired, and it was found that the audiences have definitely been reached. This sort of thing is of probable value to medical education.

Cora Paul Bomar - There is one topic that has not been discussed during this seminar that seems to be very important, and that is finding a way of discovering the unique contributions that each of the media can make in helping to carry out a specific task. I'll use television as a specific example. I see television filling perhaps three functions in schools.

The first function would be general instruction, and I think the American Samoan system fits in this category.

The second function would be using the video-tape recorder in what might be called micro-teaching. We have only thought of using this in the training of professional people, but pupils at the first grade and kindergarten level could probably learn very well in this situation as well.

The third function, which I think has the most promise for universal use, is using television as a medium to bring to the classroom things that the individual teacher can't do on his own in order to reinforce basic instruction performed in another way. That is what is being done successfully in medical shcools.

Somewhere along the way we must find a better way of exploring the unique contributions that each medium can make and then use the media to help generate a good learning situation. There are some other things we have to consider that we haven't talked about here at Quail Roost, such as deciding upon the actual content of material that should be taught, then how it should be organized, and how it should be stored and transmitted. We haven't yet even begun to tackle this problem, and this is where psychologists and educational theorists can make a great cooperative contribution.

I would like to see the development of a model large enough to demonstrate some of the practices that have been tested in the laboratory and which we believe are effective. Conceivably an entire school system might be used as a model. This would be a way of getting the people involved who should be involved in this sort of practice and making them more receptive to making major advances. If developments happen only in an isolated classroom situation, it will be 100 years before the gains are large enough to make a significant difference. The school system model would have to be built on the premise that we would not only have to redefine the roles of existing staff, but we would have to bring in to service a specially trained faculty who could help determine which media could accomplish what specific objectives. We would need to think in terms of the faculty functioning as members of a teaching team, and I think that American Samoa development might be a good example of this kind of model.

Finally, we've spent a lot of time talking about equipment and technology, but the tragedy is that we have yet to have produced the kind of equipment that is specifically designed to be used with media in an instructional situation. It is either designed for home use or for use in large institutions. I point to television receivers as an example. Industry has not yet come up with a television receiver to fulfill certain educational needs, and this could be a job for the regional production centers we have discussed.

Henry Cooke - One problem of particular interest is the in-service training of secondary school teachers. We must prepare teachers to teach their courses effectively, and by this I mean enabling them to employ new techniques and methods which will raise the quality of instruction. I think that teachers of various disciplines are not being trained capably or given the necessary background to perform well. I will refer specifically to mathematics since I believe that I am qualfied in that field.

In the schools of education and the teacher training institutions, a teacher does not come into contact with plane geometry, and a secondary school mathematics teacher is expected to teach the course without having been familiar with the material since he was in high school. Advanced geometry is taught in our training institutions, but this doesn't qualify a teacher to go into the classroom and instruct students in plane geometry.

Therefore, I advocate that we establish some central location to produce and distribute film, tape, and live television programs which focus on this particular problem. In this way a teacher can view a film concerning the best ways in which to present the concept of similar triangles, for example.

The term "master teacher" is not quite accurate, but someone who is well qualified should present this particular topic to the teachers viewing it as an in-service training program. In this way they could learn certain techniques which they haven't been acquainted with in the schools of education. This approach could be applied to all other disciplines as well as mathematics and might help to turn out more competent teaching personnel.

Robert J. Gwyn - Education throughout the United States exists within a culture of poverty, and this has many ramifications as far as the use of media is concerned. Lack of funds affects the quality of education in several ways, one of which is that educational TV is often used as a substitute for competent teaching when teachers are underpaid. Here in North Carolina, for example, and it is true in other states, television very often is used as a substitute for competent teaching to help a teacher who is so busy she doesn't have time to prepare. Many school principals assign the poorer teachers to classroom reception television sections where they act more or less as attendance takers and control discipline.

As far as production is concerned, neither the television director nor the television teacher seems willing to work really at improving quality although they both pretend to be concerned about it.

The television director says, "I don't have time to worry about applying learning theory to the production of television. All I have time to do is plot out the shots for this program. I really don't know anything about learning theory at all, because my background is in commercial broadcasting."

The teacher says, "I don't have time to do anything except get a program on the air. I don't have the material resources, time or help."

In the history section of North Carolina educational broadcasting clippings from LIFE magazine are used as illustrative material. This is all part of the culture of poverty, which indicates that in this country we really don't take education seriously.

My own background is commercial broadcasting, and I've had experience with businessmen. A man may know how to manufacture beer, but he does not appear on his own commercials; he hires someone who is a communicator to advertise for him. The skilled communicators are in New York making commercials. In order to make a good commercial, specific goals are set then copy is worked on and tested many times before a certain visual approach is decided on. To accomplish all this a great deal of money is spent. We don't do this in education at all. I don't know of anybody who pre-tests their material in a serious scientific way.

If we are going to be serious with the use of instructional media, we need to employ the resources of people who are skilled in communicating; we need to use the findings of behavioral research and social science in testing this material; and we need to define our goals.

The idea of a regional production center is a good one, but it seems to me that if you are going to have a regional production center you must have the kind of production resources available that are in New York, and you must also have access to a library of materials. If necessary, teachers should be able to get a shot of the Grand Canyon, or animation, or stop-motion photography, etc., to accomplish his instructional purposes.

I think, at least in the case of North Carolina, a regional production laboratory simply would not be successful if grafted onto the present educational situation, consisting of poor salaries for teachers, inadequate facilities, and an educational structure that has adapted itself to a culture of poverty. How do we break out of the system? We must first be committed to spending more money on both teachers and facilities before any innovations will be effective.

John Harold - I shall comment briefly on the criticisms of television, taking the position that television has simply added to many already existing educational errors. Flanders of the University of Michigan did almost eight years of research and discovered a pattern of teacher performance applicable to any public school in the United States. According to his findings, someone is talking in any classroom three-fourths of the time; and three-fourths of the time it is the teacher who is talking, and three-fourths of that time the teacher is simply expounding ideas rather than stimulating learning response and participation by students.

Television has taken that same pattern and magnified it so that it has become visible to everyone. I would like to suggest a specific strategy to remedy this situation which involves stimulation of performances and the subsequent use of a response period following the stimulation. Evaluation of such an approach would concern the amount of time the teacher does not talk and the amount of time that the pupils are responding to him as we attempted in the Samoa program. Every teacher should be trained to listen to student responses and to reply to them. This might provide one new pattern that could be worked out for a more inventive use of television.

We must realize that defensive reactions to the use of educational television must somehow be overcome, and I think that part of the reason ETV has not gained widespread approval is that up until now it has done little more than reflect the teacher behavioral patterns. When we do finally provide better patterns, instructional television will be recognized and accepted.

Everett Hopkins - This seminar has certainly confirmed what we all probably knew before we met; it is that the potential for media in actual practice is very great, and that ways must be found to implement and relate them to practical use.

I would like to reinforce the idea of the establishment of a production center for instructional materials. Laboratory experience has indicated that there are some advantages in developing such a center on a regional basis, rather than just on a state basis. The three-state region of the Carolinas and Virginia is a much more manageable situation than one in which seven, eight, or ten states try to work cooperatively. Two, three, or four states working together can develop materials without the confines of state regulations that are often a hindrance, and at the same time, this arrangement permits calling on all the resources of the several participants. Everyone should be urged to take steps toward the establishment of such centers, because they will accelerate change and advancement. Their role should not be a duplicable one, and they should not be built in any one school system or university. They should function as a means of pulling those schools or forces together which need to be pulled together to investigate problems in which they are mutually interested. At such production centers, institutions could respond to their own needs.

I would hope, also, that Federal funds would be made available for these production centers if the regions could show enough initiative and imagination to inspire the confidence of the various funding agencies including those of the states and foundations.

Edward K. Kraybill - I shall discuss some aspects of the problem of quality. How can we promote acceptance of media on the part of teaching personnel. We need to examine ways of acquainting teaching personnel not only with what media are available but with the many ways in which they can be used, and the advantage their uses provide.

One possible approach to this requirement would be to conduct on-the-scene workshops or course refreshers; sessions for bringing instructors and teachers up to date. A series of units devoted to instructional media might be incorporated into these sessions in which an attempt could be made not only to bring teachers up to date in their subject matter, but also bring them up to date with respect to facilities, equipment, and media.

While discussing an established institute for engineering teachers, four aspects of the problem occurred to me: First, the quality of the programs, and the technical quality of facilities. Second, the effectiveness of media in terms of enabling people to learn and perform. Third, the acceptance of utilization of media. (No matter how effective media are proven to be, if the teaching staff isn't interested and willing to use them, you can't go any further). And fourth, the distribution of media once they are perfected and accepted.

Ralph McCallister - I would like to make a radical proposal which goes back to the chart on the Design of Sequential Operations of Instructional Systems. I would like to see a regional production center developed as an integral part of a new instructional system. The participating institutions would have to become very much involved in the instructional production center so that it could act as an essential part of the educational system. Otherwise, I'm afraid we are going to create a new institution which would be almost wholly irrelevant to education. If such a center can be established, the teachers and administrators could begin to see the processes differently than they have seen them before, because they would have available a tremendous technology which until now has played only a secondary role in education at all levels.

Lawrence Parkus - My primary concern is for the establishment of a regional center for the production of quality instructional materials. Many of the problems which have arisen concerning the availability of quality instructional materials could be solved through such a center. I wnat to register a very strong second to the point made by Ray Carpenter that what would differentiate this center from any other existing facility would be its designed responsiveness to the educational needs of specific educational institutions. From its very inception instructional materials would be produced that have a very high probability of being integrated into the core of curricula in those institutions. I would be extremely enthusiastic about a center so formed as to meet the requirement of sponsoring institutions.

THE EDUCATIONAL DEVELOPMENT CENTER AND WBGH

A note: References have been made often to instructional materials production centers during the seminars on quality factors related to media. The evident needs for such production centers and the close relation of buildings, facilities and equipment to the quality of instructional materials led the Steering Committee and Project Staff to project a special study in this area, Educational and Instructional Television Facilities: Preliminary Practical Procedures. The study was mainly limited to television as a generic type of medium that requires other complemental media. Information was requested from 106 National Education Television stations and 14 closed circuit installations and a majority responded.

It is becomming increasingly clear as this Project continues into the second year, and as other and extensive information accumulates, that a national complement of production centers for instructional materials is urgently required.

In response to requests for information about the status of facilities, Robert L. Larsen and Kevin H. Smith wrote the following statements and gave brief but illuminating descriptions of WGBH, Boston, production problems and views, and of the Education Development Center, Newton, Massachusetts.

This Center has characteristics which make it one kind of model for the production centers that need to be built. The cooperation of the Center with WGBH constitutes another impressive working relationship.

C. R. Carpenter

EDUCATION DEVELOPMENT CENTER
FILM STUDIO
39 Chapel Street
Newton, Massachusetts 02160
(617) 969-7100

July 1, 1968

Mr. Lane E. Carpenter
The IQ-TV Project
Walnut Building
Pennsylvania State University
University Park, Pennsylvania 16802

Dear Mr. Carpenter:

Due to some very complex problems of reorganization within the Educational Development Center, this is a belated answer to the questions that you asked me on your visit here some months ago. If I understand your requirements correctly, you would like from me a rather detailed report describing the physical facility here and the type, kind and number of personnel. This follows.

As a preamble, it may be of interest to you that the EDC Studio was formed originally to support the production of motion pictures as supporting material for the Physical Science Study Committee Course in Physics for High Schools in the United States and was equipped solely for that purpose. Since that time the Educational Services Incorporated, now the Education Development Center, has expanded to include a wide spectrum of projects in education. Many of these projects used the Studio facilities for their specialized needs and the Studio itself has been asked to pursue other projects which were concentrated on film production only. All of the facilities at the EDC Studio were developed to answer the direct needs of the variety of programs it was requested to produce. Therefore, the present facility and personnel has been the direct outgrowth of need and would be very difficult to duplicate without this type of growth. The plant itself occupies about 35,000 square feet divided as follows:

1. Studio A - 2500 square feet, fully sound-isolated with sound proofed air conditioning, light grid, full overhead and floor lighting setup, pre-set switchboard and dimmers.
2. Studio B - 1250 square feet equipped the same as Studio A.
3. A sound isolated booth with three compartments serving both Studios. The booth contains full sound recording equipment both 1/4" 35mm and 16mm facility for transfer and a patch board to the entire building, as well as to Station WGBH in Boston. The main part of the booth has camera control, console for video, the necessary monitors, the lighting dimmers. This booth can be utilized for either supervision of motion picture filming or videotaping.
4. Supporting shops - approximately 8,000 square feet. The shops include a full machine shop and wood-working shop, an electronics shop, and large open floor space for the development of experimental equipment which can also be photographed in this area.
5. A classroom - approximately 900 square feet. This room is used by classes of children who are coming to the Studio to be photographed. Often they carry on their regular classroom activity here until such time as they are called into the photographic areas.
6. Editing Rooms - There are five editing suites of two rooms of about 500 square feet each. Each of these is equipped for editing both 35mm and 16mm film. This means re-winds, moviolas, synchronizers, etc.
7. Screening Rooms - There are two film screening rooms serviced by a single large projection booth. All projection equipment is on wheels and all is synchronously driven. One of the screening rooms is sound isolated and is equipped for five channel re-recording, post-synch dubbing, etc. The second screening room is acoustically treated and is used primarily for test screenings, review screenings, etc. Each of the rooms is adequate for audiences of forty people.

8. Microcinematographic facility - This area occupies about 3,000 square feet containing a microcinematographic room, a macrophotographic studio, a small screening room, a large general biological laboratory, two smaller laboratories for visitors, special preparation, and a marine growth room. The camera room contains seven stands for microcinematography, four of these are vertical stands, three are horizontal stands, one of which is equipped for viewing of phenomena from underneath. All of the stands are equipped with Arriflex 16mm cameras, and suitable timers, temperature controls, continuous lines for nutrient, etc. The laboratory area is equipped with the usual biological equipment, micro manipulators, sterilizers, sinks, cabinets, etc.
9. Graphic Arts and Animation - This department occupies approximately 1200 square feet, contains a large drawing room, a camera room with an Oxberry animation stand, a processing room for still photography and the preparation of cels, an area for still photography with equipment for extraction of stills from motion picture sequences and photographic copying. This department does titling effects, storyboard development, graphics for the stage and cel preparation for animation.
10. A suite of five offices for Directors and a second suite of six offices for resident and visiting scholars.
11. Photographic equipment - In addition to the photographic equipment mentioned previously, the sound stages are equipped with one 35mm BNC Mitchell, one 35mm standard Mitchell, one blimped Arriflex 16mm camera, one 35mm Eclair camerette, one 35/16mm Eclair camerette, one Arriflex BL with a slave Nagra audio recorder for "hand held" shooting, one Hycam 400-foot high speed camera capable of shooting to 12,000 frames per second, and two Eastman Super 8mm Instamatic cameras, one Fearless dolly, one smaller four-wheel dolly, and a variety of camera tripods.

Television Equipment

To meet the rising need, three or four years ago, for an easy method to record children in classroom situations, the Sloan Foundation and Carnegie Corporation saw fit to make the funds available for equipping our Studios with a full complement of electronic cameras and videotaping equipment, as follows:

1. Four TK 60 RCA, 4 1/2" image Orthicon Cameras and the supporting chains, monitor bank, etc.
2. Two Ampex 7,000 1" VTR's with five Videcon Cameras, one Sony 1/2" VTR. In lieu of quadruplex videotape machinery we have installed multiplex coaxial cabling between our studio and Station WGBH, the educational network station in Boston. These cables allow us to send all four camera signals from the TK 60's into WGBH as fully balanced signals which enables us to use their recording room, switchers film chain, etc. This allows us to time share a major television installation which will be kept modern. It allows us to go as far as putting a tape recorder behind each of our four big cameras. Our Directors work from our own booth with balanced telephone lines to technical staff at WGBH as well as our own floor crews and technicians. We are able, also, to make a simultaneous recording on 1" Ampex which, in effect, gives us an instant "work print." This system is working very well for us. We are able to time-share the WGBH facility in four-hour blocks. Kinescopes from the tapes we have made with this system are of high enough quality so that we feel perfectly free to intercut filmed materials with videotaped materials without any noticeable disparity in quality.

Personnel

The permanent staff of the Studio numbers about 45; this includes an Executive Producer, a Production Manager, a full camera crew which also handles the videotaping, a film editing crew of twelve people, four shop technicians, five Producer-Directors, a staff Biologist, a Staff Physicist, two Staff Engineers, a Film Librarian, and secretarial support.

The substance of our films is very much in the control of various experts and scholars who work closely with us on the various productions.

Over the past ten years the Studio has released between three and four hundred titles for commercial distribution, plus a large number of experimental pieces. This production has included the release of the first pedagogical series for the Technicolor silent cartridge-load machine. Six years ago the Studio produced what we think is the first commercially released film to be done using computer-assisted animation, and since that time has used this technique on a regular basis in a number of films. EDC has become a gathering center of information concerning this technique. A variety of technical and scientific papers have resulted from the work at the Studio.

I hope this report contains information that will be useful to you. Again, let me offer my apologies for its lateness, and I will certainly be glad to supply any further infomration that you may consider relevant.

Sincerely,

Kevin H. Smith
Vice President

WGBH: QUALITY INSTRUCTIONAL MATERIALS - May 6, 1968

Robert L. Larsen - The equipment and facilities of WGBH and our technical staff are very adequate for the production of very high quality instructional materials. However, we are not consistently reaching our production potential on school materials.

The reason is threefold: general commitment, creative staff and adequate funds.

General Commitment. The production of effective ITV materials requires great and consistent effort on the part of the whole organization. A community station is more likely to put most of its commitment into public TV because that is where the staff gets recognition, and that is where the public funds are. Many university and school system stations seem to lose their active commitment to innovate and to produce first-rate ITV programs because they work on a subsistence basis. A "civil service attitude" creeps in and becomes the main activity of the station and the staff.

WGBH has had a better than average commitment to ITV. We have always insisted on quality over quantity--and this is one of the main reasons why 85 percent of our ITV programs have been distributed nationally and internationally.

A year ago we established the Education Division. For several years the "civil service" process in the 21" Classroom had been reducing available funds for new production, diminishing the schools' use of ITV, and stultifying the innovative and relevant applications of the medium. Our new Division is gradually using its own resources to develop relevant new methods and curricula for ITV because we believe that we cannot be held back by the 21" Classroom.

Creative Staff. In many public television stations, the most talented and creative people move to public programming because that is where the action is. The rewards are greater both in terms of personal satisfaction and salary. University and school service stations do not often attract the most promising or creative people.

WGBH has almost always had some of its staff willing and available to lend their communications and other skills to produce instructional materials. With our new Education Division, we are beginning to develop a new kind of ITV professional, one who is committed to that specific field, who keeps up with the latest in communications, teaching-learning methodology, and new cirriculum. He is encouraged to be creative, inventive and experimental. He receives concommitant rewards by being paid as much as his public TV counterpart. It is a slow process, but we are already getting some good results.

Creativity in educational broadcasting must extend into the areas of audience recruitment, promotion, and services to the schools. It is useless to continue the prevalent custom of thinking that the whole job is done by just broadcasting the programs and sending out notices to the schools. The teachers and supervisors have to be made aware of what television is doing for them. They must become collaborators and there must be continuous supportive services. We are starting to do this in small ways with very appreciable results.

The innovative approach must be used in combining instructional television with other appropriate media.

Adequate Funds. With adequate funds, our plant and personnel could produce three or four times as much instructional materials for the schools as we do now. And the programs would be relevant, useful, and needed. At present we have developed proposals with the schools, but no adequate funds are yet available. Many of the recent, most promising ideas for the schools are so expensive to produce that no single ITV operation can afford to use them. Individual ITV organizations and teachers do not tend to cooperate and pool their funds for quality productions. They are engaged in quantity production in their own areas of interest.

Most of the instructional projects that we would like to do, and that seem most worth doing should have nation-wide use, and they should have the same production quality as any national network programs. There is, strangely, no national production center for ITV materials, although there are distribution centers. There are few, if any, stations doing national level productions of high quality because they have to provide local services and work on local budgets. The reasons why there are no national production centers probably lie with the way schools are run in this country: local option with no national curriculum. The local TV organizations were set up on this principle and they perpetuate this principle. Local control may be fine for certain things, but when it virtually mandates low quality instructional materials, it is not good. There are certain curricula and certain learning methodologies which are universally accepted and needed.

The solution to the condition that exists is federal and foundation sponsored regional production centers. At the moment the foundations are cool to ice-cold about the idea. Health, Education and Welfare has little or no funds for this kind of development, and when they do have funds, they seem to be most interested in a limited demonstration or an experiment. It is hard to find any source of major funds for an important ITV project involving new teaching methods and new curriculum.

Therefore, we continue to have a decimated ITV field, where each little production center is producing its little poverty programs, and few or none are reaching the potential that should be reached. Furthermore, because they aren't reaching the potential, there is diminishing enthusiasm for ITV from the schools, the administrators, the school committees and the public. At this rate, ITV may die before it can show its great potential for serving educational needs.